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Winner of more stunt contests than all makes combined.

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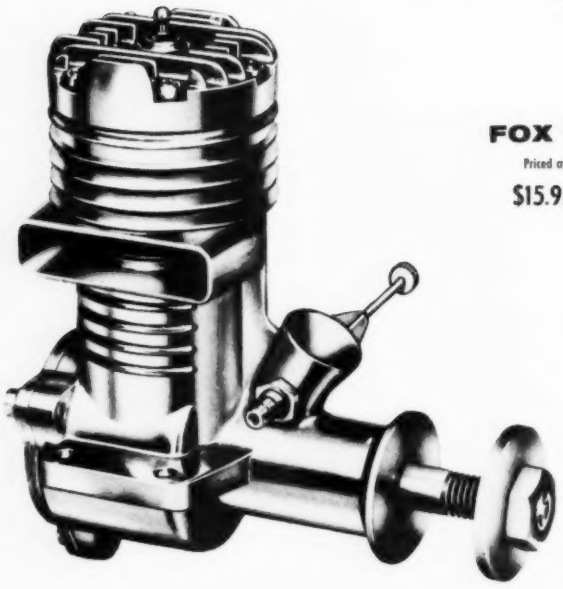

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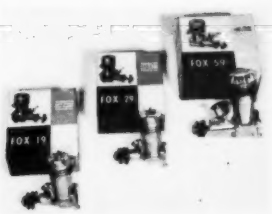

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All Metal Fittings and All Necessary Metal Fittings

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- All Metal Fittings are Provided Propeller, Stuffing Box, Driveshaft, Rudder, Steering Arm, Searchlight Running Lights & Handrail Posts.

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Ocean Going Type

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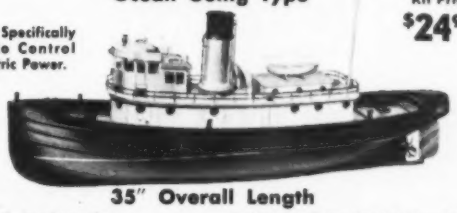

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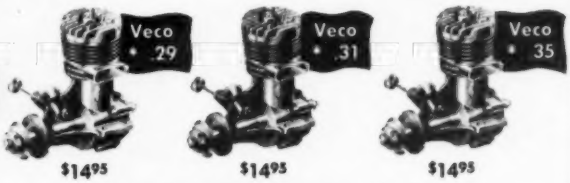

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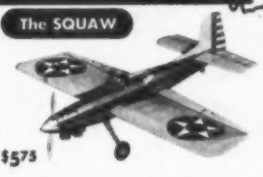

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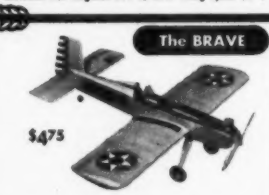

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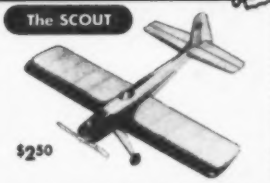

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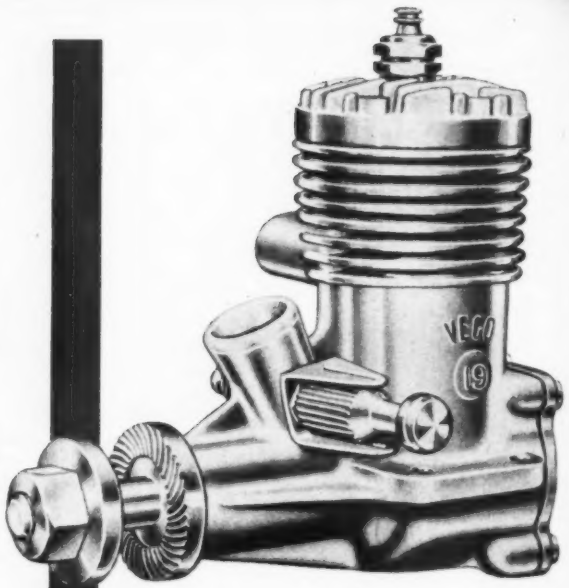
Engine Review Veco .19



Compact powerhouse that does not need babying to stand up.

By E. C. MARTIN

► The new Veco .19 will do well and we have no hesitation in making such a confident prediction. It is the kind of engine that has all the features for performance and yet is so massively built throughout that it defies you accidentally to damage it. In addition it introduces a number of materials and methods of manufacture that may well be copied in its competitors. No detail has been skimped and every feature gives the impression that the engine will go—and keep on going—no matter what. If it were of a suitable capacity, it is the sort of engine the team racing boys would latch onto with little screams of joy.

To do the Veco justice, we will describe the construction in detail because its value lies not in any trick development but simply in the logical combination of all the known features which go to make a hot, sturdy, reliable power unit. It is the engine we would recommend for the fellow of limited means who likes to bash a stunt model around for hours on end and believes the only requirement on the blunt end of the model is a full tank.

The crankcase is a pressure die casting embracing the main bearing, intake and cylinder barrel. It receives only three machining operations after tumbling and all other surfaces are ready for business as they come out of the die. The cylinder barrel is bored to fit the ground liner. The mounting holes, head and backplate bolt holes and intake are drilled and then the appropriate holes are tapped and you have your main casting completed. The main bearing has a cast-in bushing of sintered iron which appears to be supplied finished to size as is usual with this material. Apart from pushing a broach through to cut a small oilway, removing the burrs from the intake drilling and sizing the bore should there be any distortion, no other work is necessary. The intake is 5/16 diameter but is fitted with a ¼ restrictor retained in the usual manner by the spraybar. Heavy webs strengthen the ⅛ in. thick main bearing housing, the horizontal webs joining up with the under surface of the ⅛ in. thick mounting lugs to provide a mounting surface of large area. The mounting lugs are located, in plain view, somewhat forward of the usual position and blend in with the bearing housing, thus providing support fairly close to the prop.

The bypass passage, of large cross section, is smoothly finished and is radiused at the top to mate up with the port. The crankcase rear cover is relieved to match the bypass and direct the mixture rising from the bottom of the crankcase. It is also relieved at the top for piston clearance at BDC.

The crankshaft, of virtually indestructible proportions, has a mainshaft of 13/32 in. dia. and a gas passage of 9/32 in. dia. The rotary valve port is rectangular and of large area giving early opening and late closing, the timing being quite hot for anything but a racing engine. A standard ¼ in. thread long enough for props up to ½ in. hub thickness and a thick steel prop drive washer located by a flat and shoulder take care of the drive. The crankpin is fully counterbalanced and fitted with a floating duralumin bushing for the forged aluminum conrod. Without the removable bushing it would not be possible to get enough angularity on the piston and rod assembly to dismantle the engine.

A tubular wrist pin of 5/32 in. dia., fitted with brass end pads, connects the rod to an extremely light, hardened steel piston which is machined from bar stock. The interior of the piston is end milled away on either side of the wrist pin hole supports to achieve the very light weight and a straight fence baffle is milled across the crown. The lapped skirt is relieved for the bottom third of its length so that this portion only serves to control the port timing.

Sintered iron is again employed for the cylinder liner, but is machined all over apart from the bottom edge. The ports are very wide and radiused at the corners, with the bore relieved slightly from just below the ports downward. A fairly easy slip fit is employed between the liner and crankcase and the top rim of the liner is arranged to (*Continued on page* 48)

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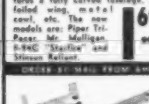
Shown here is the Piper "Tri-Pacer"

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27th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

JULY 1956 Vol. LV—No. 1

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by William Winter

► The summer sun shines nearly 24 hours a day, and there is a dead calm that lasts six months, writes Captain Robert Allyn, USAF, from Fairbanks, Alaska, on a 45-degree below-zero night. But during the long winter the sun does not rise on Decmeber 21. Cap remarks happily, "You sure can catch up on modeling for the next year!"

You know, it is amazing how much modeling goes on all over the world, by night and by day, in the jungles and in the frozen lands. You may be reading this in England, Sumatra, Sweden, Java, Poland, East Africa, or Walla Walla, it may be midnight or high noon, but somewhere, some guy is running an engine!

In Fairbanks where you build models six months, all night in other words, and fly the next six months (and dead calm, the man said!) there are good facilities both in town and on the Air Force bases for controlline flying—sport, combat, or stunt. There's an excellent field for RC (20 jobs on the base alone) and free flight. Midnight flying sessions on weekends—in broad daylight. Seems to us a guy may never grow tired of modeling but he could get awfully sleepy.

Big problem is supplies, which have to be ordered from "outside." Since being stationed at Ladd Air Force Base, in 1954, the Captain says he has done more building than ever. Service life in Alaska is anything but the two-year exile from modeling that he had expected. Frozen north?

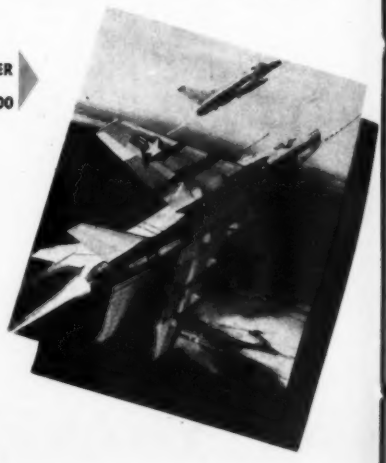
* * *

There's nothing like a free swinging "discussion" of the rules, especially free flight, to set the joint to jumping. Bob Hatschek, whose subscription copy was hijacked, phoned to ask, "Whatever did you say in the new issue? Dunwoody is mad and, if he is mad, I probably am mad, too!"

A lot of guys are mad at a lot of other guys who were mad at Don Alberts for his contention that anyone who favors heavier loadings, wants to legislate himself into the winners' circle, because he can't build and control the lightweight atomic pile that is the modern contest free flight.

Serving his second term as president of the Aurora Prop Busters, Denver, Colorado, Dewey W. Beach, AMA 16,702, and a Contest Director, incidentally sides with Don Alberts (leave things the way they are!) but also effectively blasts the tendency to change rules so often. (*Continued on page* 6)

NEXT MONTH'S COVER
Sabre 100



PLANE ON THE COVER

In 1927 the Boeing FB-5 single-seat fighter was in naval service for operation from the first big carriers. The design was adapted from the Army Boeing PW-9 series. Powered by a Packard 500 hp liquid-cooled engine, the FB-3, and the production FB-5, had the then remarkable speed of 187 mph. Wing span was only 32 feet.

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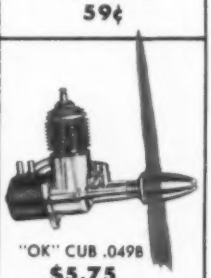

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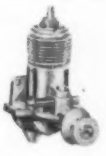

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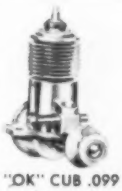

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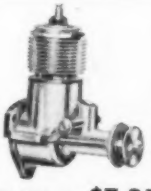

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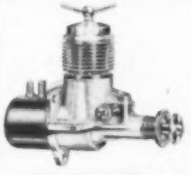

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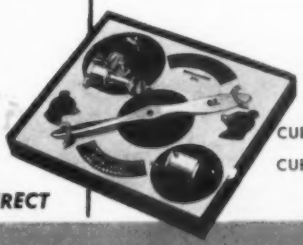

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MAN at Work

(*Continued from page 4*)

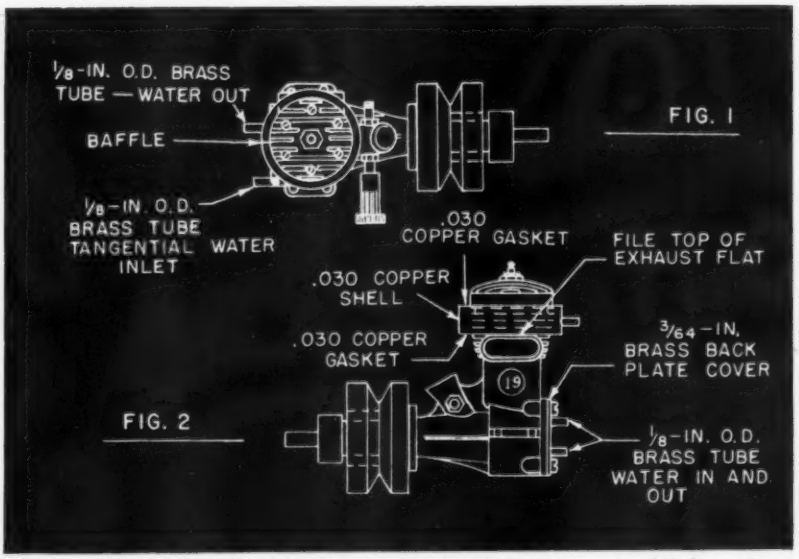
"The problem of quite a few modelers is lack of time and money," Dewey points out. "I like to build all types of models and I like competition, but that is where the rub comes. I find that building, testing, etc., in two or three classes, is about all I have time for. As soon as I get one good model going, wham, the rules are changed! Either that or else I stand looking at an empty work bench, afraid to start a model, as there is a big yell going on about changing the rules.

"I sympathize with Merrill Coombs, whom you quoted, who quit rubber, PAA, towline, etc., because of rules changing. I have stuffed a lot of crates in the ash pit because of a rule change."

In Denver, where Dewey officiates, he cannot compete, so like other enthusiastic local modelers, he has been known to drive as far as 700 miles to a contest. The closest to Denver that he found a contest was 110 miles. When you have only two airplanes that are up to rules, contest going can be discouraging. Imagine how the international set feels over the radical changes in FAI rules!

"The consensus among those you have quoted seems to be that heavier models would take out the luck in free flight."

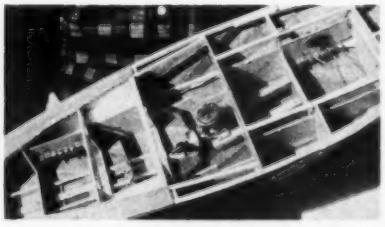
(*Continued on page 45*)



These two sketches indicate how the author attached the cylinder jacket, and cooled the crankcase.

Water Cooled K & B Allyn .19

By LARRY W. SARTOR—*Would you like to convert that .19 for an RC boat? It is simple.*



Left—The finished engine, converted to water cooling. Right—How the engine is mounted in a boat.

With R. C. boats becoming more popular, the author decided to try his hand in that field of radio control. Here is how he solved the inboard motor problem by water cooling a K & B Allyn .19.

The head and cylinder liner were removed, the gaskets taken off, and copied onto a sheet of .030 anealed copper. The outside diameter of the copper head gasket was increased by ⅜" and the cylinder liner copper gasket O.D. was enlarged to match the O.D. of the head gasket.

The sealing surfaces of the copper gaskets were coated with Permatex No. 2 and the motor was then reassembled. A baffle was soldered in place as shown in Figure 1. Next a copper shell, of the same material as the gaskets, was soldered in place.

With the head fins now jacketed, the holes for the tangential water inlet and the water outlet were drilled and ¼" O.D. brass tubes were soldered in place.

For additional cooling, the concave area of the back plate may be used by making a brass plate cover as shown in Fig. 2.

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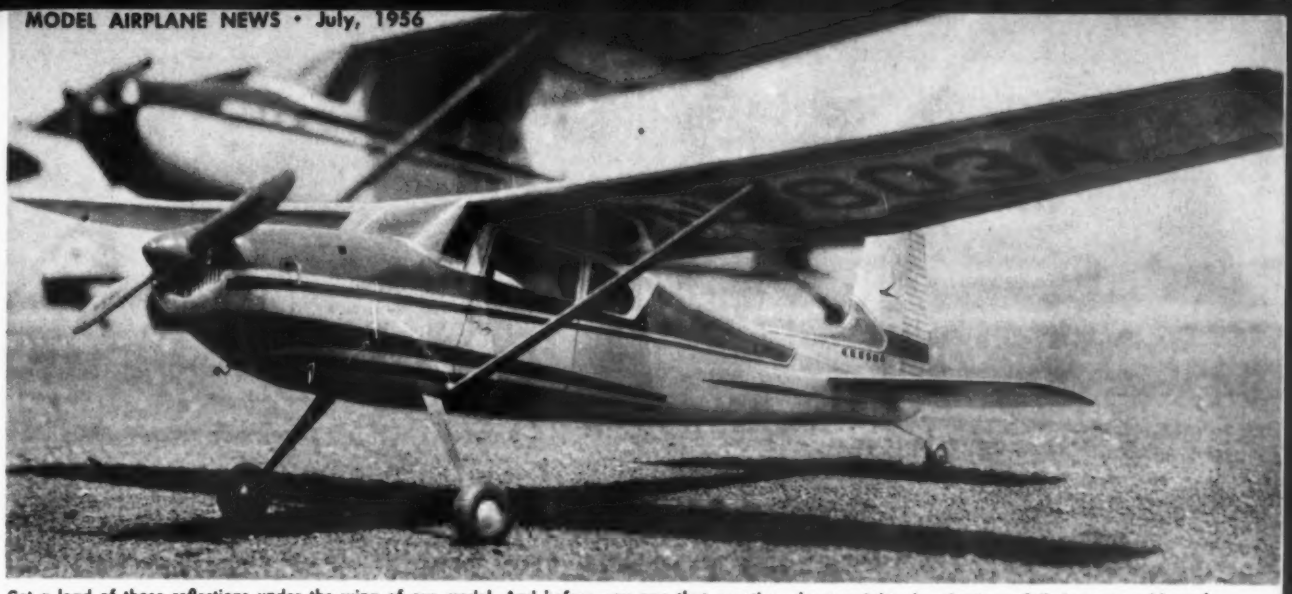


Get a load of those reflections under the wing of our model. And before you pop that question about weight, the aluminum foil does not add much.

the Cessna 180

How to make metal-covered flying Half-A powered model, using Reynolds Wrap aluminum foil, contact bond cement.

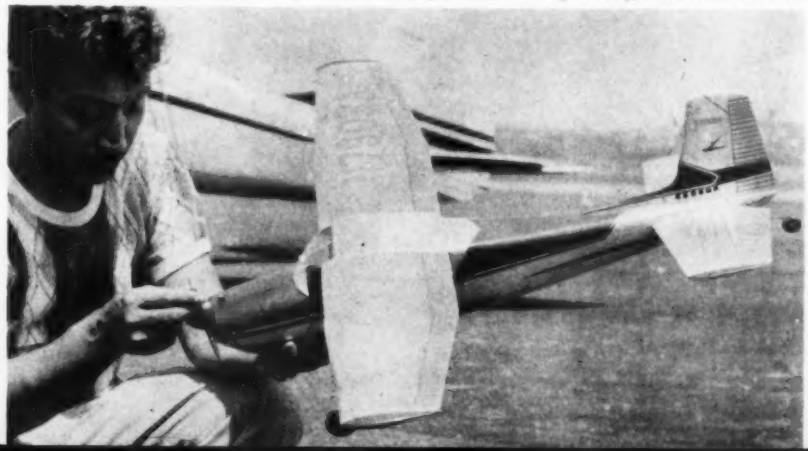
By JOSEPH LATERRA

► The greatest pleasure I get out of model airplanes is in watching a realistic scale job perform. The more real looking, the better. And what could be more real than a metal-covered flying model? This Cessna 180 is unusual because it is covered with alumnium foil over sheet-balsa covered frame. Using materials on the market, you will not find it very difficult to cover with metal.

Start construction by cutting out 1/16 in. medium sheet balsa sides. Mark off former locations with a soft lead pencil and cement formers in place, with the exception of F-2. Drill landing gear J-1b Bolt locations shown on front view of plan. Bend landing gear to shape. Bolt to F-2 with 3/32 in. J-bolts, using plenty of cement on nuts. Cement F-2B in place and add ¼ in. sq. balsa to brace former to sides of fuselage.

Cut four window frames from 1/32 in. sheet balsa. Cut two pieces of clear celluloid to window frame sizes and sandwich one piece of celluloid between two pieces of window frame with cement, being careful to keep cement clear of window portion of celluloid; then cement in place on cabin sides. Add ⅛ in. sq. cabin braces along formers and sides, as shown on plan. Cement ¼ in. OD thin walled aluminum tubing in place for wing strut locations. Next cut top and bottom sheets and cement bottom sheet in place.

One paint job that wasn't goofed. Rivets don't show up in picture but author approximated rivets by means of an old clock gear on a handle. Or, if you want to keep it easy, metal can be left off.



Build wing center section and cement to fuselage in proper location. Tongue is made of ⅛ in. sheet hard balsa or pine. Add ¼ in. OD thin walled aluminum tubing for wing retaining rubber bands to pass through. Add top sheet and cover center section with grain running spanwise. Use 3/32 x 3/16 in. planking for fuselage corners. Tack-cement cowl blocks and carve. Take apart and cut motor mount slots in side pieces. Cement permantly bottom and side pieces of cowl and cement to front of fuselage. Top and nose pieces are fastened with dress snaps for access to motor compartment. I made windshield of .045 in. Plexiglas molded to shape because of the compound curve of original. It can also be made of 1/64 in. celluloid with a slight sacrifice in scale appearance. Make tail block of medium balsa. Cement tail wheel gear in place with plenty of cement before cementing to fuselage. Use masking tape to cover all glass to prevent scratching. Sand window frames to level of fuselage sides and finish sanding rest of fuselage.

The wing is built in two halves. Each half is built in two sections, inboard and outboard, which are cemented together after completion. Make box from plan. Insert box through ribs W-1, W-2 and W-3 and cement. Shape .020 in. music wire retaining hook and cement to medium balsa block. Cement between W-1 and W-2 in location shown on plan. Block

Two-piece wings detach, just like the real thing. Requisite for metal covering is liberal use of Sanding Sealer and a velvet smooth sanding of wood.

size to be flush with upper and lower surface of ribs. Make sure hook location lines up with aluminum tubing in center section. Cut 1/16 in. sheet balsa skins for inboard section of wing. TE of lower skin is tapered as shown in rib view of plan.

Mark off rib locations and cement ribs in place. Cement upper skin in place. Sand LE of skin flush with ribs and cement LE in place. Follow same procedure with outboard section of wing and add soft balsa block tip. Cement panels together and pin on flat board, top side down, to insure straight line on top surface of wing. Cut ¼ in. length of 1/32 in. ID brass tubing. Sew and cement in location on bottom surface of wing shown on plan.

For stabilizer, cut sheet balsa skins to shape and mark off rib locations. Cut ribs and cement in place on sheet. Cement top sheet in place. Sand LE and TE of skin flush with ribs. Add LE and TE. Use soft balsa for tips. Cement in place and finish shaping and sanding.

For rudder, follow same method as for stabilizer. Add dorsal fin before shaping LE. After cement has dried, finish shaping and sanding.

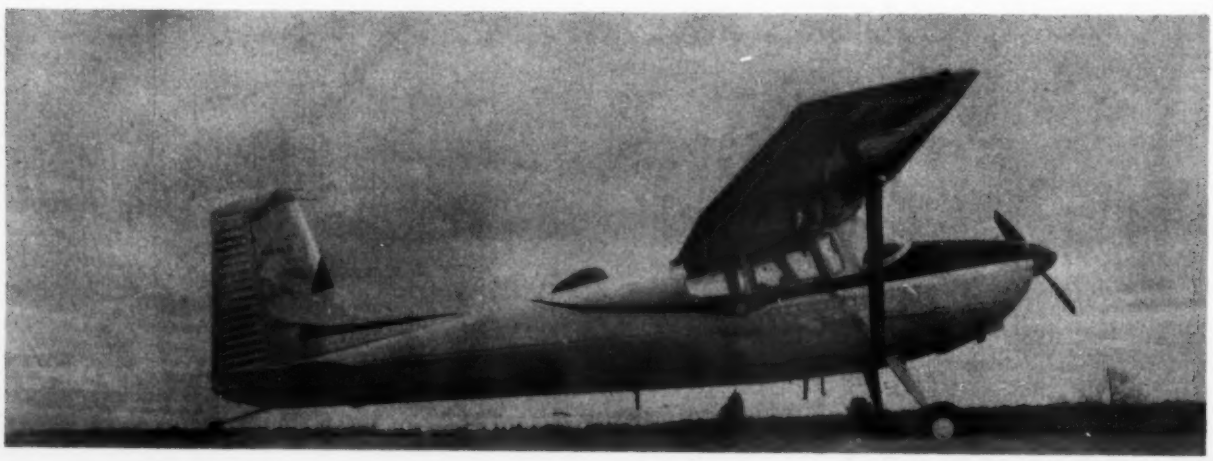
Now you're ready to put finishing touches to your model. Give all parts two coats of clear dope and sand to remove rough spots. If model is to be covered with aluminum foil, it is imperative that finish on wood be perfectly smooth. This is accomplished by the liberal use of Sanding Sealer, sanding between coats with 400 grit wet-or-dry sandpaper. Use sandpaper dry. Finish sanding with 600 grit wet-or-dry. The aluminum foil, which, incidentally, is the same stuff the little woman uses for lining her baking pans, can be obtained in any grocery store. Just ask for "Reynolds Wrap."

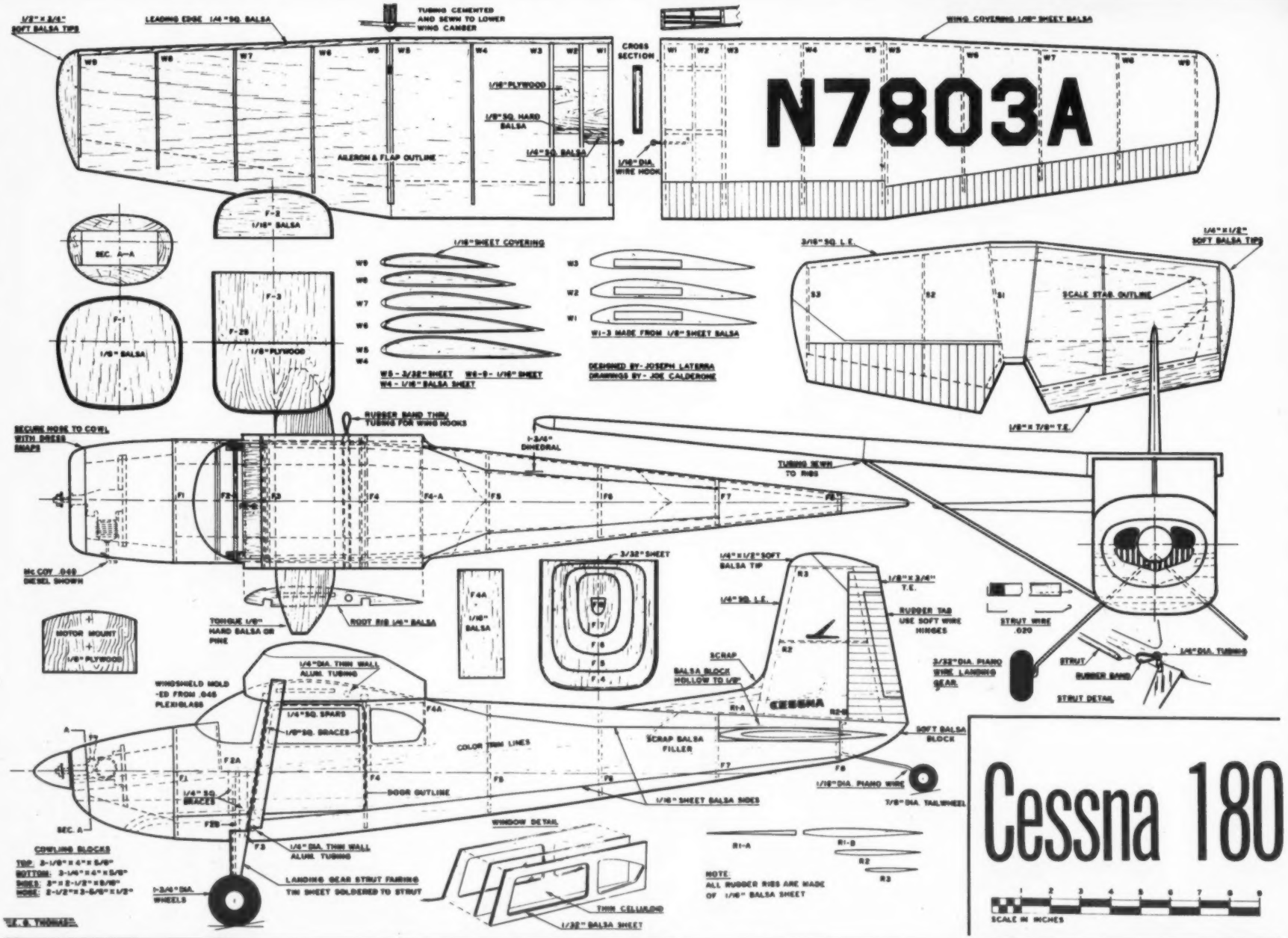
I tried different adhesives for applying the aluminum foil with little success until I tried "Ed Schlosser's 10-Minute Glue" thinned with two parts of lacquer thinner to one part of glue. This is a contact glue and both surfaces have to be coated before joining. Follow directions on bottle for use.

Recently, Goodyear's famous Pliobond was introduced into our field.

Foil can be worked around compound curves if used in small sections. Use soft balsa block for smoothing foil. A visit to the local airport will give you an idea of where to locate skin edges and rivet lines. Rivets can be simulated by using old clock gear fastened to suitable handle. Using straight edge, roll gear on aluminum to form rivet impressions. Scale color scheme is jet red or mallard green on aluminum. Color lines should be masked off and portions where colored dope is applied should be sanded with 600 grit sandpaper, so dope can adhere to surface. License numbers are cut from red Trim Film. Emblem and Cessna name on rudder may be cut from black Trim Film. Corrugated control surfaces and door outlines can be drawn in with Indian ink.

To fly, test glide and add clay or solder until smooth straight glide is obtained. Model has downthrust built in. Adjust rudder for right turn in glide and a left hand turn will result under power.





FULL SIZE PLANS AVAILABLE. SEE PAGE 51.

Start of speed run during the last Nationals. One-line ships broke records across the board last year. Speed is not the mystery it used to be.

how much FASTER?

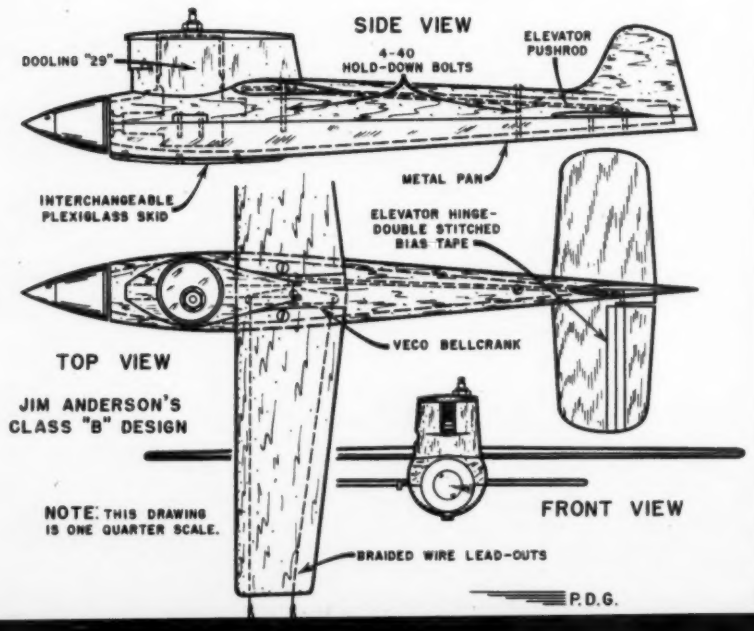
By LEO R. HOLLIDAY

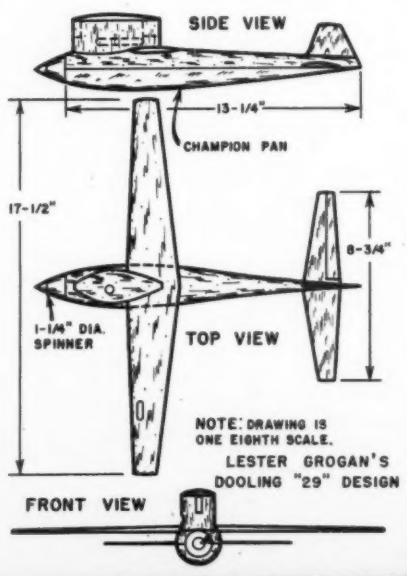
A torrid year was 1955 for speed flying. Here's authoritative rundown of events.

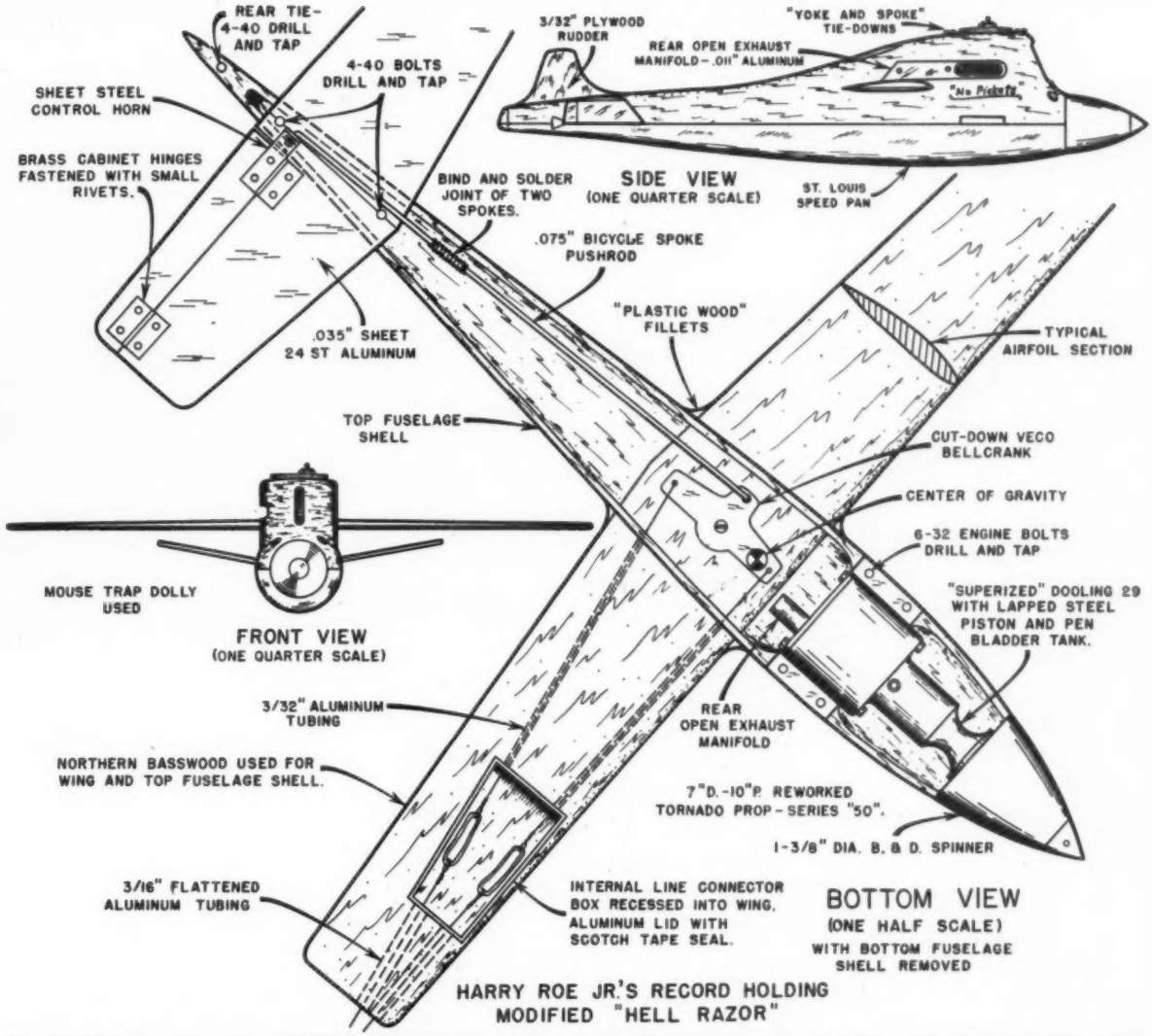
► At the close of a contest season, speed fliers sit back, take a good look and see what they have done wrong, throw out some pet theories and acquire new ones. This article interprets a glance at what happened at the 1955 Nationals and some of the big meets during the last season and the names of some of the outstanding modelers who did the flying.

The tip off to the whole contest season was illustrated by the closing events in 1954. Some of the boys down in Texas, using that very mild winter weather, racked up a record in Class C Speed. The team of Clem and Beasley pushed fellow Texan Leland Morton's 160 mph record right out of existence with a flight of 167-plus mph. That record, at the time, seemed untouchable. The same team also breathed down the neck of Harry Roe, Jr.'s fine 145.6 mph Class B record, missing it by only .2 mph.

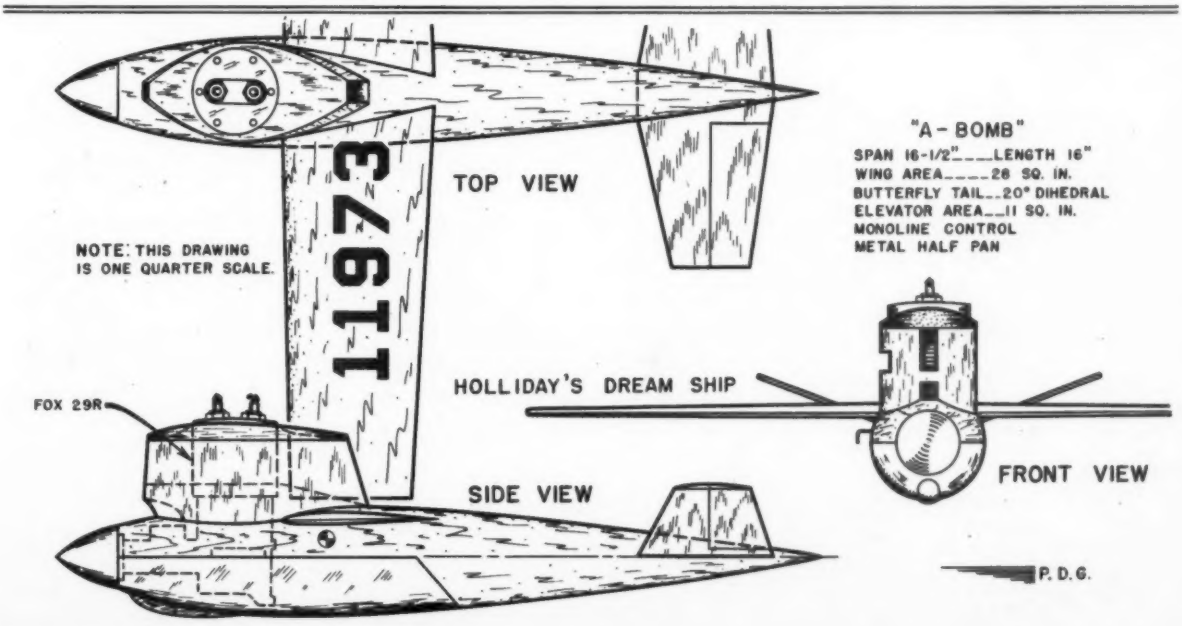
Meanwhile, Bill Wisniewski was going for the world's record in Class II FAI Speed and bettered fellow American Bob Luker's 1954 World Championship record by the necessary 5 mph with his (*Continued on page 49*)






REAR TIE-4-40 DRILL AND TAP
4-40 BOLTS DRILL AND TAP
SHEET STEEL CONTROL HORN
BRASS CABINET HINGES FASTENED WITH SMALL RIVETS.
BIND AND SOLDER JOINT OF TWO SPOKES.
.035" SHEET 24 ST ALUMINUM
.075" BICYCLE SPOKE PUSHROD
"PLASTIC WOOD" FILLETS
TOP FUSELAGE SHELL
3/32" PLYWOOD RUDDER
"YOKE AND SPOKE" TIE-DOWNS
REAR OPEN EXHAUST MANIFOLD-.011" ALUMINUM
"No Prickets"
SIDE VIEW (ONE QUARTER SCALE)
ST. LOUIS SPEED PAN
TYPICAL AIRFOIL SECTION
CUT-DOWN VECO BELLCRANK
CENTER OF GRAVITY
6-32 ENGINE BOLTS DRILL AND TAP
"SUPERIZED" DOOLING 29 WITH LAPPED STEEL PISTON AND PEN BLADDER TANK.
MOUSE TRAP DOLLY USED
FRONT VIEW (ONE QUARTER SCALE)
3/32" ALUMINUM TUBING
NORTHERN BASSWOOD USED FOR WING AND TOP FUSELAGE SHELL.
REAR OPEN EXHAUST MANIFOLD
7"D.-10"P. REWORKED TORNADO PROP-SERIES "50".
1-3/8" DIA. B. & D. SPINNER
3/16" FLATTENED ALUMINUM TUBING
INTERNAL LINE CONNECTOR BOX RECESSED INTO WING. ALUMINUM LID WITH SCOTCH TAPE SEAL.
BOTTOM VIEW (ONE HALF SCALE) WITH BOTTOM FUSELAGE SHELL REMOVED

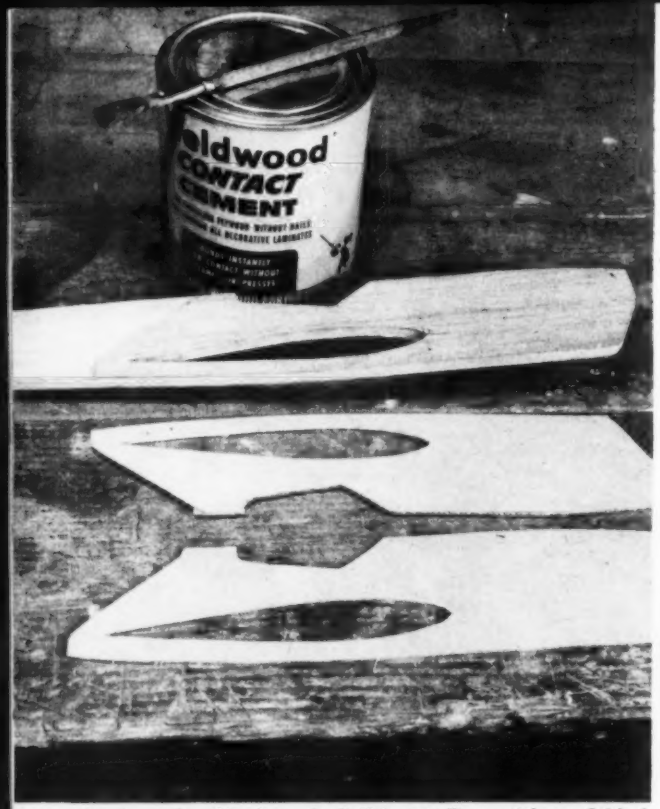
HARRY ROE JR.'S RECORD HOLDING MODIFIED "HELL RAZOR"



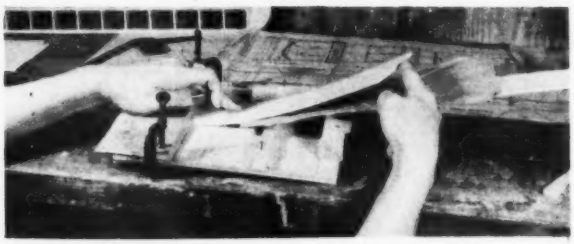
where and how to use CONTACT CEMENT

By WARREN H. CURTIS

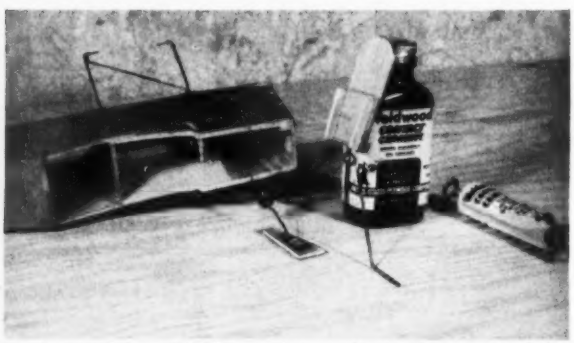
Construction immensely speeded up by proper use of fascinating new adhesives.



One hour after this photo, the Half-A controlline model was finished. Fuselage, ply sides, here. Coat each, let dry, press together, zowie.



Curved doublers bonded: wrapping paper protector between coated parts. Remove paper 2-3 in. at time and make contact by stages.



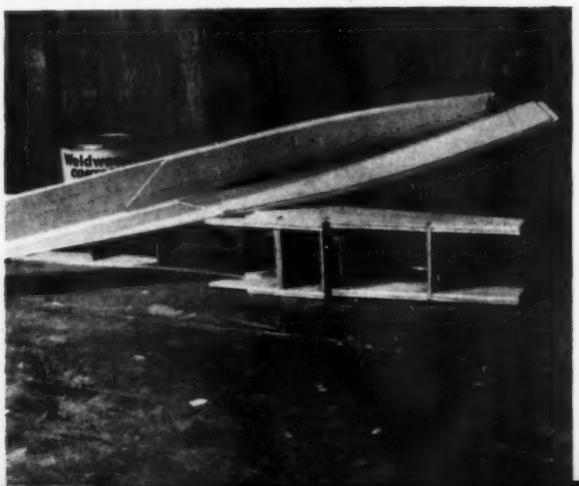
Repairs speeded up. Rebuilt nose, here, and a landing gear sandwich. Soldered joint on tail wheel proved weaker than the bonding cement.

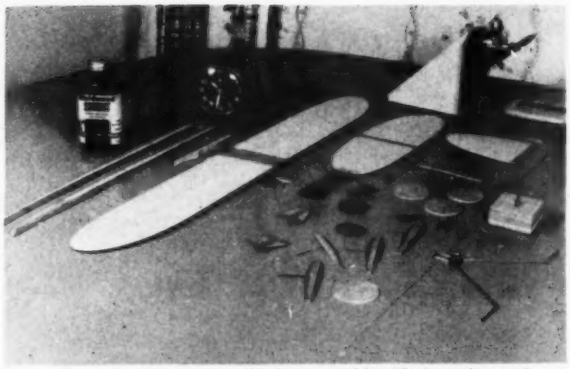
Editor's Note—*At the time this project was carried out, contact bond cements had not been advertised for the model builder. Recently, Goodyear's Pliobond and Ten-Minute Glue have appeared in our field. These products have already demonstrated their value in recent MAN construction projects.*

► Of the many innovations which have contributed notably to the present high development of model aviation, some can be regarded as milestones of progress. Japanese tissue, balsa wood, cellulose cements, the model engine and U-control, to name a few, have each in turn influenced the general trend. And now there is another, which, for simple convenience, is certain to become a favored item of model construction. This is a new kind of cement that has proven itself in shoe-repairing and the building trade. Fundament-

Round Robin controlliner built in one hour. Wing joint was made wet, dried overnight for vibration-proof bond. Wing slips in, that's why.

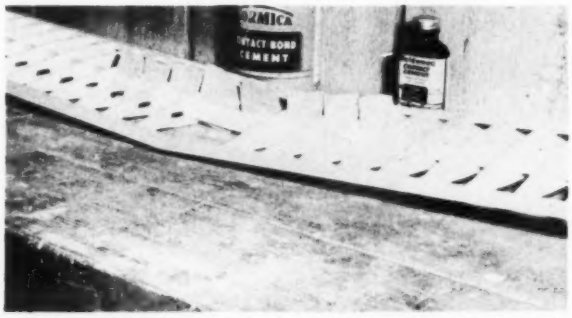
Twenty-five minutes to assemble Veco Chief fuselage. Bent, flat, doublers cinch. Formica in this case. Interlocking joints, regular cement.



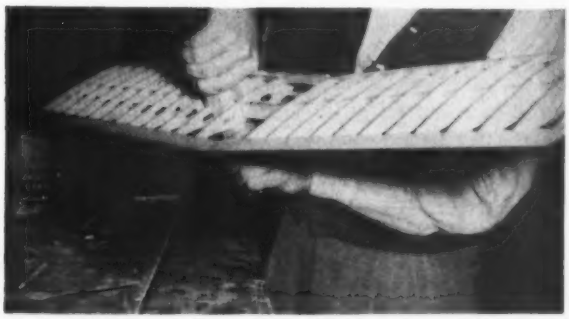


Super Cloud Tramp parts ready for assembly. Block, right, with vertical pin in center is wheel jig. Wheel pliers slide over pin—line up.

Fifteen minutes later, model has been put together without pins and other aids. Sheet wing holds camber on contact with rib. Infant .02.



Spar joiners, tool Scrap wrapping paper between spars and joiners, in between ribs. Slide joiners in, remove scraps vertically, one at time.



Joiners pressed to spars for good bond by means of two sticks squeezed together like clamps. Blocks, etc., assembled, carved immediately.

ally a rubber-type cement, but made with solvents of the lacquer type, its outstanding feature is the manner of use.

A coat of this cement is applied to both faces of a prospective joint and then allowed to dry without contact. When, and only when, firmly dry, the coated faces are alined, allowed to touch and then forced into full contact. Instantly the two apparently dry coatings bond to each other in a joint that is every bit as strong as the pre-dried cement films. This feature of bonding upon contact is the identifying and most valuable property—and also the most troublesome. Let the coated surfaces meet unintentionally and this latter fact will be learned forcibly. They will have to be separated with thinner, cleaned and the coating process repeated.

Leading edge sheeting and center sections natural for contact bonding. Small area joints in tension cannot be satisfactorily made, however.

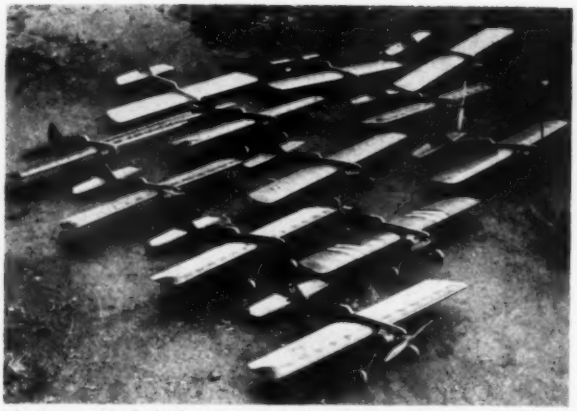
To be found in widely separated fields, there are 10 contact-bond cements known to the writer, all wonderfully suited to certain model airplane demands. Five are of the shoe-repair trade, known as "all-purpose" types. They, consisting of the Barge, Cat's Paw, O'Sullivan's, Petronio's and "XL-8" brands, are sold by leather-supply houses. At least four are used to cement decorative paneling, plywood and plastic laminates such as Formica, Micarta and Panelite. Stocked by building-supply, paint, hardware, and linoleum stores, these carry the trade names of Formica Contact-Bond, Weldwood Contact, Panelite Contact Adhesive and Sears-Roebuck's Plastic Laminate Adhesive. Then, as advertised in MAN, there are Pliobond and Ten-Minute Glue. Yielding nicely to nitrate and butyrate thinners, these new cements are "friendly" with the dopes and cements we commonly use.

There are two general types of joint in model plane construction: closed joints, where strength derives entirely from the cement within the joint itself, and open joints, in which the strength is gained from an encasing film of cement. Contact-type cements are suitable only for closed joints, where internal area affords a distribution of load. Inherently flexible and of low tensile strength, they are incapable of sustaining the concentrated load of an open-type joint. Such joints, characteristic of fuselage, wing and tail framing, are best made with regular model cements. However, a frame may be "tacked" together with contact cement, after which the joints are encased with a regular type.

Proper pre-drying and sufficient contacting pressure are essential. From 5 to 40 minutes, depending upon the weather and the weight of the application, will be needed for every trace of the liquid state to have vanished. If bonded too early, there will be little or no contact strength, with the cement pulling apart like chewing gum. While extended drying toughens the (*Continued on page* 39)

Old Faithful...

Hagen, left, adjusts the compression of David-Anderson Diesel for one of the boys. Other engines, like .19 glow,, can be used. See the plan.



All the models built by the group, here shown, flew successfully in spite of mighty rough beginnings! The best ones did horizontal eights!

DURING my military service, I was asked to give a course for some of my fellow soldiers and teach them a little about how to build and fly a U-control trainer. I accepted this invitation and started to design a suitable plane, having especially three things in mind: it had to be easy to build for a newcomer to aeromodeling, yet should prepare him for building more advanced models later; it had to be sturdy in order to stand rough treatment by a novice flier; also, it had to look a little like an airplane.

After some thinking and drawing, I finally evolved the plane described and it fulfilled the requirements very well.

None of the 12 boys participating in the course had ever built or flown a U-control model. After about three weeks of spare-time work, using only simple tools, they all had their planes built.

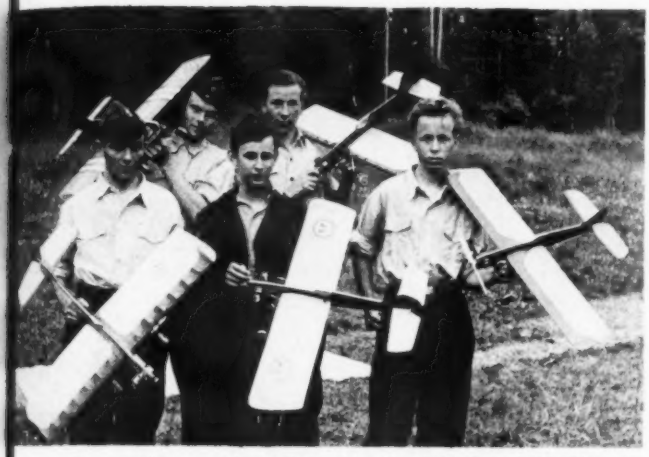
Then we started to fly. In the beginning it seemed more like digging as they just went up and then down into Mother Earth. It really surprised me how well the models stood up. The weakest point is usually the joint between the fuselage and wing but the reinforcement with silk usually left the models in one piece after the "plowing." After a while the boys started to learn and some became really good.

Easy to build and cover, Old Faithful, nevertheless, is an example of good detailed design. The Norwegian beginners flew inverted. And you?

Checking out a brand new job, Hagen explains to its builder how proper running of engine is essential to performance, to avoid crack-ups.

By **KNUT HAGEN**

During army duty, Norway's National Champ set up a course in model flying for fellow soldiers. This model was big success.

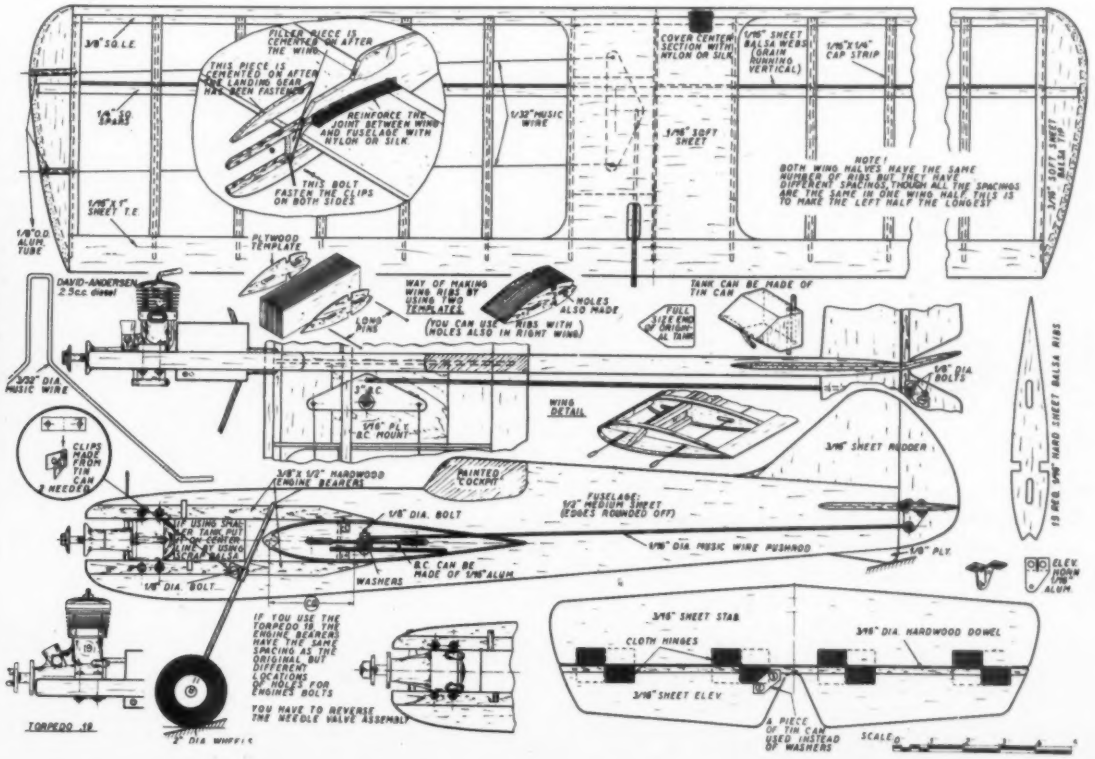


Five proud owners show off the ships they built. Remarkable thing was that, from scratch, fliers became "hot rocks" in only five weeks' time.

At the competition the Air Force sponsored at the conclusion of the course, the most proficient performed loops, inverted flying and even horizontal eights with this trainer in spite of strong wind. I considered the result quite good, since five weeks before they had never had any contact with U-control, building or flying.

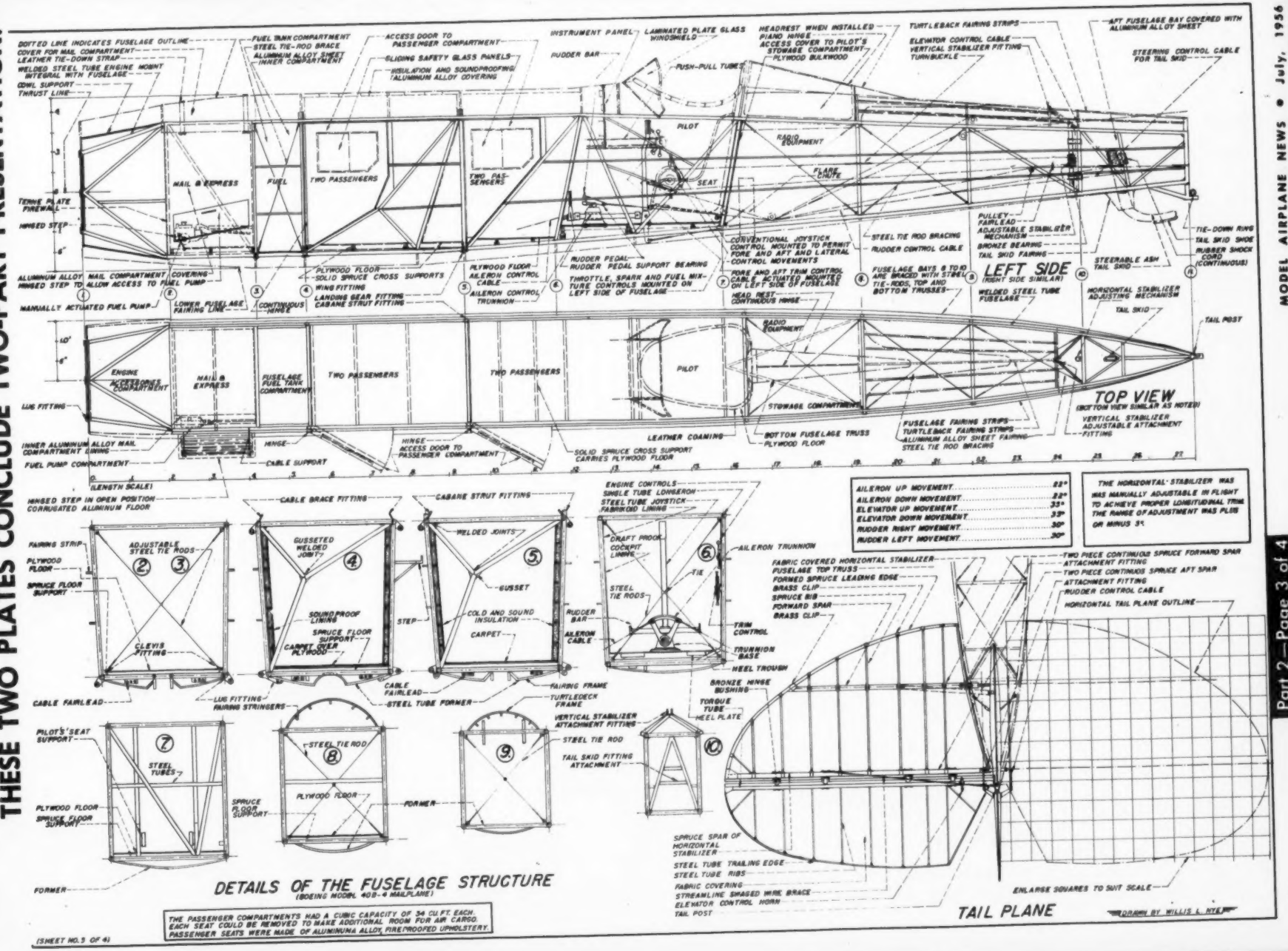
The original model was powered by a Norwegian David-Andersen Diesel of 2.5 cc. The Torpedo .19 shown is optional. This will give a little (*Continued on page* 39)

No question that it is possible to make this model in a barracks or anywhere else. Just chair and a card table constitute the work shop.

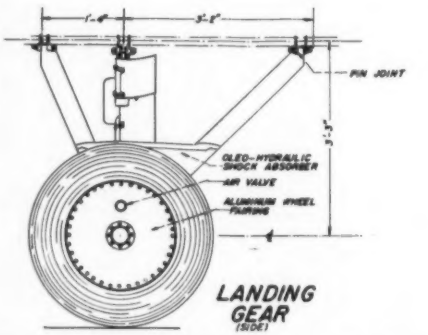

FILLER PIECE IS CEMENTED ON AFTER THE WING
THIS PIECE IS CEMENTED ON AFTER ALL LANDING GEAR HAS BEEN FASTENED
REINFORCE THE JOINT BETWEEN WING AND FUSELAGE WITH NYLON OR SILK
THIS BOLT FASTENS THE CLIPS ON BOTH SIDES
1/32" MUSIC WIRE
3/16" SOFT SHEET
COVER CENTER SECTION WITH NYLON OR SILK
1/16" SHEET BALSA WEBS (GRAIN RUNNING VERTICAL)
1/16"X1/4" CAP STRIP
NOTE! BOTH WING HALVES HAVE THE SAME NUMBER OF RIBS BUT THEY HAVE DIFFERENT SPACINGS, THOUGH ALL THE SPACINGS ARE THE SAME IN ONE WING HALF. THIS IS TO MAKE THE LEFT HALF THE LONGEST
1/16" SOFT SHEET BALSA TIP
1/8" SQ L.E.
1/8" SQ SPARS
1/16"X1" SHEET T.E.
1/8" O.D. ALUM. TUBE
PLYWOOD TEMPLATE
DAVID-ANDERSEN 2.5cc. diesel
WAY OF MAKING WING RIBS BY USING TWO TEMPLATES
(YOU CAN USE HOLES ALSO IN RIGHT WING)
HOLES ALSO MADE
RIBS WITH
LONG PINS
TANK CAN BE MADE OF TIN CAN
FULL SIZE END (BOTTOM) OF TANK
3/32" DIA MUSIC WIRE
CLIPS MADE FROM TIN CAN 3 NEEDED
2" R.C.
5/16" PLY R.C. MOUNT
WING DETAIL
1/8" DIA BOLTS
3/16" SHEET RUDDER
19 REQ. 1/16" HARD SHEET BALSA RIBS
PAINTED COCKPIT
3/8"X 1/2" HARDWOOD (ENGINE BEARERS)
FUSELAGE: 1/2" MEDIUM SHEET (EDGES ROUNDED OFF)
1/8" DIA. BOLT
1/16" DIA MUSIC WIRE PUSHROD
1/16" PLY
ELEV. HORN 1/16" ALUM
WASHERS
R.C. CAN BE MADE OF 1/16" ALUM
1/8" DIA. BOLT
IF YOU USE THE TORPEDO 19 THE ENGINE BEARERS HAVE THE SAME SPACING AS THE ORIGINAL, BUT DIFFERENT LOCATIONS OF HOLES FOR ENGINES BOLTS
YOU HAVE TO REVERSE THE NEEDLE VALVE ASSEMBLY
3/16" SHEET STAB
CLOTH HINGES
3/16" DIA. HARDWOOD DOWEL
3/16" SHEET ELEV.
A PIECE OF TIN CAN USED INSTEAD OF WASHERS
TORPEDO 19
2" DIA WHEELS
SCALE

FULL SIZE PLANS AVAILABLE. SEE PAGE 51.

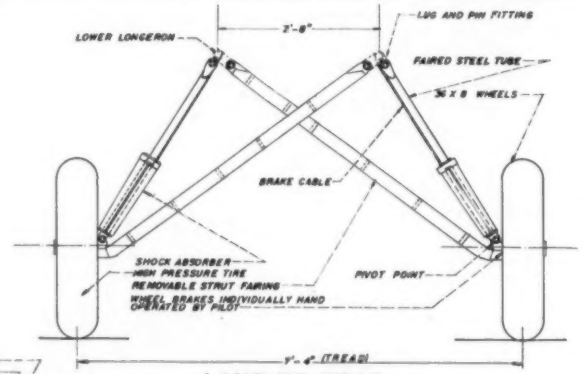
THESE TWO PLATES CONCLUDE TWO-PART PRESENTATION.


LEFT SIDE
(RIGHT SIDE SIMILAR)
TOP VIEW
(BOTTOM VIEW SIMILAR AS NOTED)
DETAILS OF THE FUSELAGE STRUCTURE
(BOEING MODEL 40B-4 MAILPLANE)
TAIL PLANE
AILERON UP MOVEMENT ..... 22°
AILERON DOWN MOVEMENT ..... 22°
ELEVATOR UP MOVEMENT ..... 35°
ELEVATOR DOWN MOVEMENT ..... 35°
RUDDER RIGHT MOVEMENT ..... 30°
RUDDER LEFT MOVEMENT ..... 30°
THE HORIZONTAL STABILIZER WAS MANUALLY ADJUSTABLE IN FLIGHT TO ACHIEVE PROPER LONGITUDINAL TRIM. THE RANGE OF ADJUSTMENT WAS PLUS OR MINUS 3°.
THE PASSENGER COMPARTMENTS HAD A CUBIC CAPACITY OF 34 CU.FT. EACH. EACH SEAT COULD BE REMOVED TO MAKE ADDITIONAL ROOM FOR AIR CARGO. PASSENGER SEATS WERE MADE OF ALUMINUMA ALLOY, FIREPROOFED UPHOLSTERY.
(SHEET NO. 3 OF 4)
DRAWN BY WILLIS L. NYE

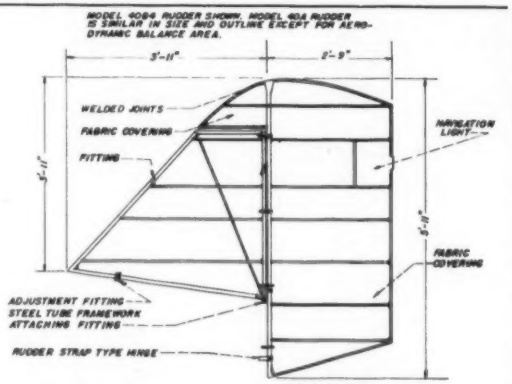
BOEING 40—THE GREAT MAILPLANE OF THE 'TWENTIES.



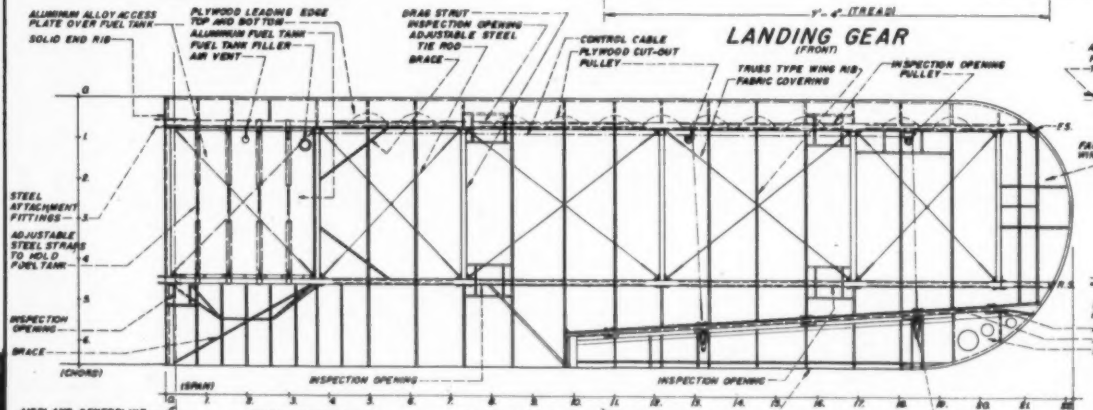
LANDING GEAR (SIDE)



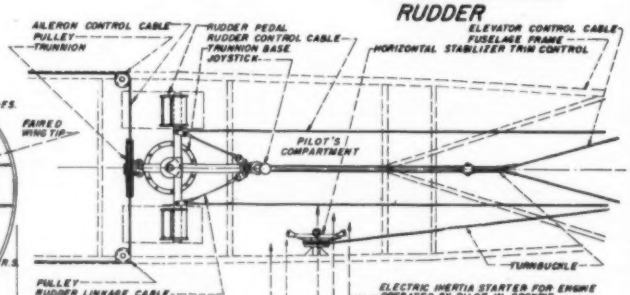
LANDING GEAR (FRONT)



RUDDER



TOP WING (RIGHT SHOWN) (LEFT SIMILAR)



FLIGHT CONTROLS (TOP VIEW)

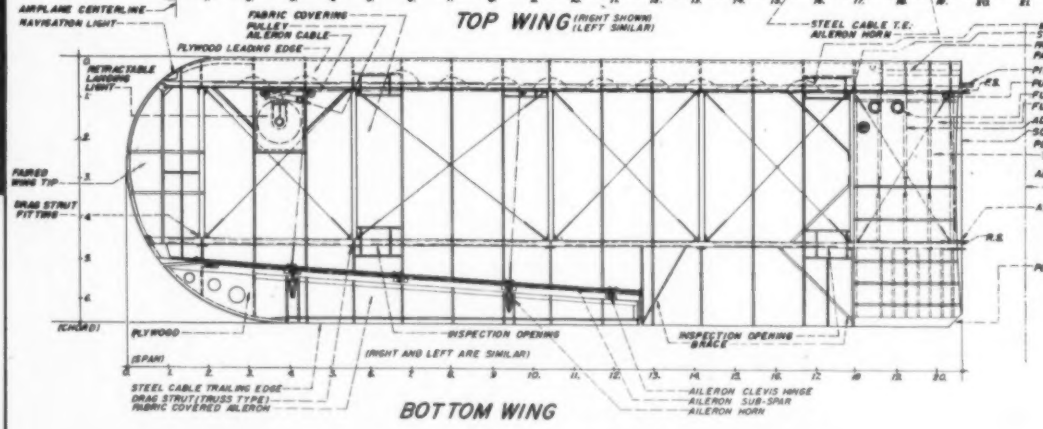
ELECTRIC INERTIA STARTER FOR ENGINE OPERATED BY PILOT IN COCKPIT.

CO_2 PRESSURE TYPE FIRE EXTINGUISHER COVERING ENGINE AND FUEL TANK COMPARTMENT OPERATED BY PILOT IN COCKPIT.

LANDING LIGHTS WERE RETRACTABLE BY PILOT IN COCKPIT OF MODEL 40B-4. RETRACTION AND EXTENSION OF 90° ARC WERE CONTROLLED BY CABLES.

ELECTRICAL SYSTEM WAS ENERGIZED BY 6-VOLT STORAGE BATTERY AND AN ENGINE-DRIVEN GENERATOR.

PILOT WAS PROVIDED WITH ELECTRICALLY HEATED FLIGHT CLOTHING.



BOTTOM WING

PRODUCTION DATES	
MODEL	DATE
40	1925
40A	1927
40B	1928
40Y	1928
40C	1928-29
40B4	1929-31
40B4A	1929

COMMERCIAL OWNERS
ASSOCIATED OIL COMPANY
PRATT & WHITNEY AIRCRAFT CO.
EMPIRE OIL CO.

BOEING AIRFOIL 93		
CHORD	BOTTOM	TOP
0.00	0.00	0.00
1.25	8.90	8.10
2.50	11.91	9.17
5.00	1.42	6.26
7.50	0.88	9.55
10.00	0.64	10.33
15.00	0.37	11.30
20.00	0.13	12.28
30.00	0.02	12.70
40.00	0.00	12.54
50.00	0.00	11.94
60.00	0.11	10.91
70.00	0.35	8.38
80.00	0.68	6.16
90.00	0.71	3.84
95.00	0.85	2.30
100.00	1.00	1.11

THE BOEING MAILPLANE COULD BE ADAPTED TO OPERATION ON SNOW COVERED AIRPORTS BY ATTACHMENT OF SKIS TO THE LANDING GEAR AND TAILSKID. THE SKIS WERE BRACED WITH CABLES AND MADE OF CORRUGATED ALUMINUM ALLOY.

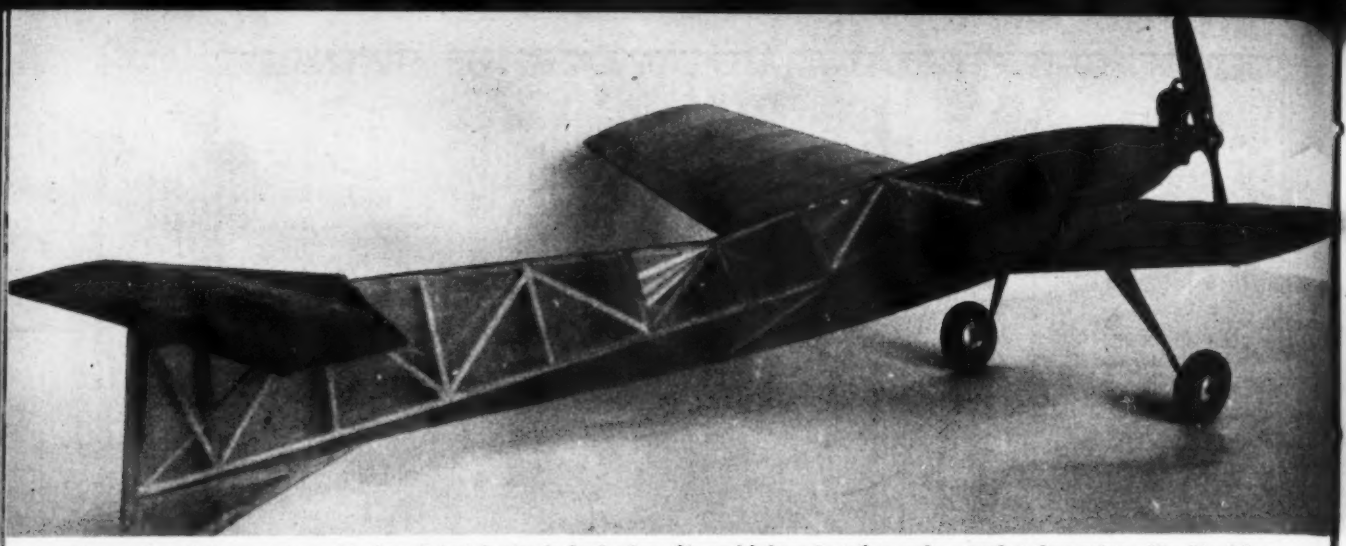
THE PROTOTYPE MODEL 40 WAS OF SAME GENERAL CONFIGURATION EXCEPT "N" TYPE INTERPLANE STRUTS WERE USED, 400 H.P. LIBERTY WATER COOLED ENGINE WITH A TUNNEL RADIATOR, FORWARD FUSELAGE SECTION OF WELDED STEEL TUBING, AFT FUSELAGE STRUCTURE OF PLYWOOD, RUBBER SPRUNG LANDING GEAR, BEING THE DISTINGUISHING FEATURES.

ALL BOEING MODEL 40 AIRPLANES WERE BUILT AT BOEING FACTORY IN SEATTLE, WASHINGTON. THEY WERE FLIGHT TESTED AT BOEING AIRPORT.

THESE AIRPLANES WERE AMONG THE FIRST TO BE EQUIPPED WITH RADIO NAVIGATIONAL AIDS AND TWO WAY RADIO COMMUNICATION EQUIPMENT.

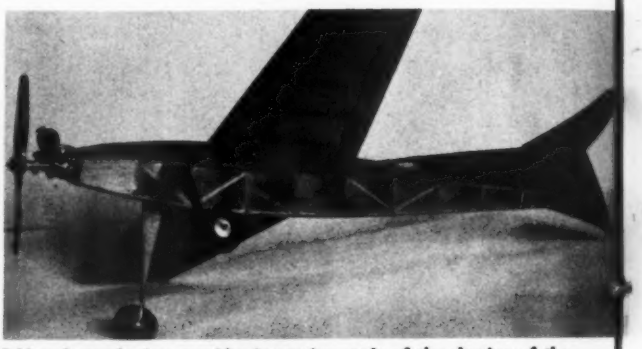
SHEET 4 OF 4.

DRAWN BY WILLIS L. NYE



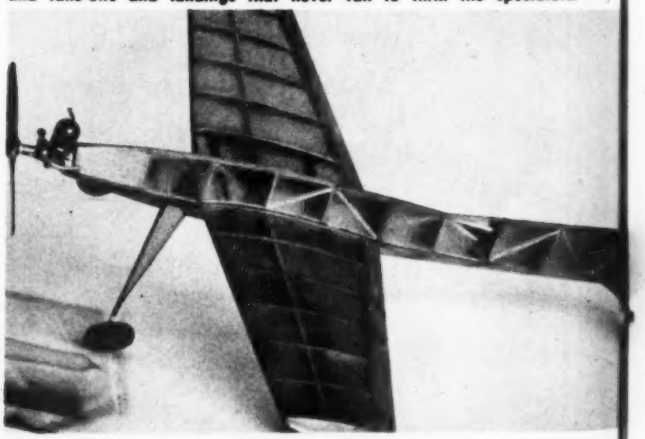
The new long look comes to model plane design! Coming in for landing, this model drops its tail to make a perfect three-pointer. Mac Diesel here.

"Slip-stick" at the ready, Ray checks over final Humdinger drawings. Even if duration suffered, designer wanted zippy performance. Got it!



Odd underneath view provides interesting study of the shaping of the fuselage toward the rear in order to act as fin and rudder area.

Stubby wings and long fuselage give plane a fast arrow-like flight and take-offs and landings that never fail to thrill the spectators.



the HUMDINGER

By RAY BOOTH

Here's something truly different in Half-A free flight, a ship that gets up and goes like racing plane. And different to build!

FOR some time the designer has had the urge to break away from the more conventional pylon models in an effort to produce an interesting free flight ship with snappy performance but not necessarily long duration, at the same time bearing in mind ease and simplicity of construction and, consequently, repair.

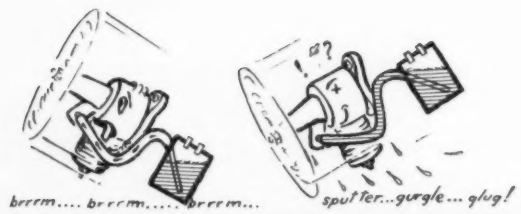
Properly trimmed, Humdinger will reward its builder with consistently zippy flights, with take-offs and landings which will draw murmurs of admiration from spectators. The landings in particular are a dream to watch, as the ship has a rather peculiar characteristic. As the model drops within 1 ft. of the ground during its glide approach, the nose rises slightly and the tail drops, resulting in a perfect three-pointer on a fairly smooth surface. This characteristic doubtless stems from the position of the stabilizer in relation to the wing, "ground effect" causing the wing to "balloon" and the tail to drop.

Construction of the fuselage is probably a little unorthodox and the following assembly procedure is recommended. Pin down over the full-size plan the ⅛ in sq. hard-balsa longerons at the top and bottom of the fuselage and, thoroughly cementing all joints, add the ¼ x ⅛ in. strips forming part of the under fin, the ⅜ x ⅛ in. fin and the ¼ x ⅛ in. strip which stiffens the stabilizer platform. Next, cement in place the ⅛ in. sq. spacers between the longerons at each of the former positions, as illustrated in the perspective view on the drawing. The keel diagonals, cut from 1/16 x ⅛ in. strip, can now be fitted into position, completing the center keel ⅛ in. thick.

While the keel is still pinned (*Continued on page 46*)

1/2° RIGHT
2° DOWN
1/8" X 1/4"
1/8" X 9/16"
LEADING EDGE 1/8" SQ.
RIB 1
RIB 2
RIB 3
RIB 4
RIB 5
RIB 6
RIB 7
STIFF PAPER TUBES 3/16 INSIDE DIA. FOR HARDWOOD DOWELS
SPAR 5/16" X 1/8" TAPERING TO 1/8" SQ.
TRAILING EDGE 3/16" X 3/4"
3/16 INSIDE DIA. STIFF PAPER TUBE FOR WING DOWELS
SOLID BALSA TIP
TILT RIB 1 AS SHOWN BELOW TO GIVE 1-5/16" DIHEDRAL AT WING TIP
RIBS 1 & 2 ARE 1/8" SHEET, RIBS 3,4,5,6,7 1/16 SHEET
STABILIZER 1/16" SHEET
1/16" X 1/8" KEEL DIAGONALS
STABILIZER PLATFORM
1/16" WIRE
3/4"
4-3/8"
3-3/4"
1/32" WIRE
UNDERCART DETAIL
6-4 PROP
McCOY 049 DIESEL
STIFF PAPER TUBE TO TAKE UNDERCART RUBBER
1/16" X 1/8" KEEL DIAGONALS
1/8" X 1/4"
1/32" SHEET
1/16 BRASS TUBE
1/16" SHEET
WHEEL TRACK 7"
F1, F1a, F1b ARE 1/16" PLY - ALL OTHER FORMERS 1/8" SHEET BALSA
1/8" SHEET FUSELAGE SIDE RIB
1/8" X 1/16" FUSELAGE SIDE BRACES
"OIO" CELLULOID
1/8" SQ.
TYPICAL SECTION THRO' FUSELAGE
1/8" SQ. SPACERS AT EACH FORMER POSITION
CONSTRUCTION OF CENTER KEEL, SHOWING ATTACHMENT OF HALF-FORMERS (PORT SIDE) DURING ASSEMBLY OF FUSELAGE
1/4" X 1/8"
STABILIZER PLATFORM 1/8" SHEET
STABILIZER
3/8" X 1/8"
1/4" X 1/8"
1/32" WIRE SKID
SCALE IN INCHES
HUMDINGER
designed & drawn by RAY BOOTH

FULL SIZE PLANS AVAILABLE. SEE PAGE 51.



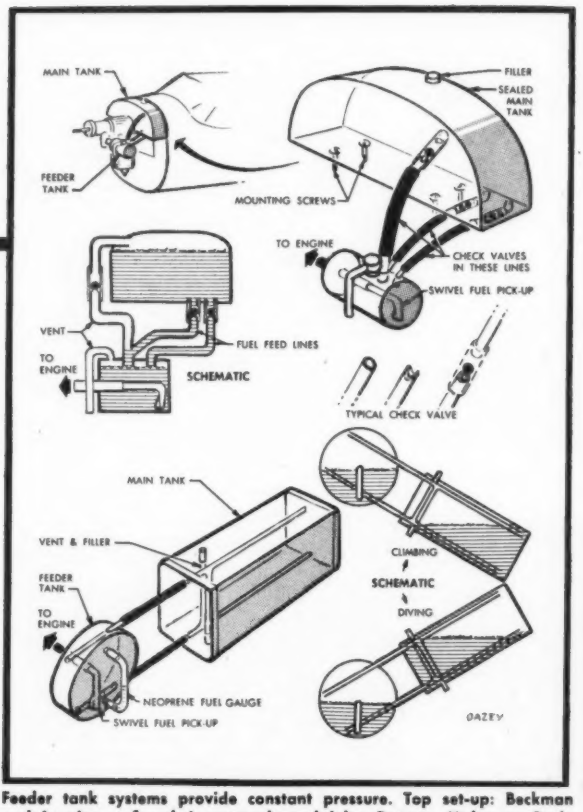
tanks for aerobatics

By **FRANK C. DAZEY**

Walker pressure tanks and regulators are one answer to fuel feed problems, but it seems that many ingenious ideas exist.

► As the cartoon shows, the main problems in fuel feed for an RC model is development of a large head of fuel pressure when the model is diving and no head of pressure during climb. Also, a model designed for inverted flight must have some provision for fuel feed when in that inverted attitude. Another problem is that, right after a model has been hand-launched, the engine sometimes stops because the mass of the fuel in the line is affected by the force of acceleration and the engine starves out. Sometimes, surge problems occur when a very lively model is doing aerobatics.

However, the prospective RC flier should not let these problems make the sport seem unduly complicated. Much very successful flying can be done with a simple fuel system, as demonstrated by Ed Friend's winning the '55 Nationals Rudder Event with a standard Froom tank and by Alex Schneider's winning the multi event with a simple clank tank. However, when Schneider's plane noses down, the engine is running rich and, when it's climbing, the engine leans out, but the big Anderson Spitfire never stops running and, despite this fluctuating performance, Schneider was three times able to win the Nationals.

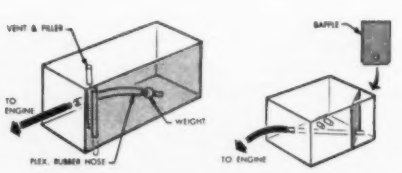


Feeder tank systems provide constant pressure. Top set-up: Beckman and Lenninger. for their seven-channel jobs. Bottom: Mahoney, Bush.

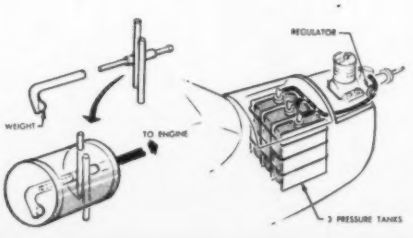
Therefore, it seems that the most suitable fuel system depends on what the individual modeler wants, what type of engine he's using and the type of aerobatics his ship will perform. The standard engineering answer to the problem in full scale airplanes, automobiles, etc., is a pressurized fuel supply. Walker pressure tanks and regulators are widely used in RC and models so equipped usually fly with steady engine power. It has been found that it is important to check the performance of each regulator with a yardstick, pan of water and fuel lines, all rigged up as a manometer.

A very ingenious fuel system is the "chicken feeder" set-up developed by Bob Beckman and Bob Lenninger. As can be seen in the sketch, the main tank fills the feeder tank until the lines are closed off by the fuel level. Then no more fuel can enter the feeder tank. The engine always is supplied with the same level of fuel. A large diameter vent line is necessary to prevent capillary action. Windshield-wiper hose is about right. When the model is inverted, the check valves all close and the engine runs off the feeder tank only. Two feed lines are used in case engine heat causes a temporary vapor lock in a feed *(Continued on page 42)*

Clank tank, left, for inverted flight. Baffles cure surge. The tank on right is used by Forbes, in a very frisky Thermal Hopper airplane.



Commercial solutions to RC fuel problems are the deBolt swivel tank and the Walker pressure system. For big engines, multiple tanks used.



Radio Control NEWS

By E. J. LORENZ

What's needed is an electronic brain to keep track of all this stuff! Items and news.

Real eye-catcher is Nate Rambo's Spirit of St. Louis—multi-channel job, right. Looks sacrificed a bit for performance. Ship flies beautifully despite loading. Dazey sketch, below.

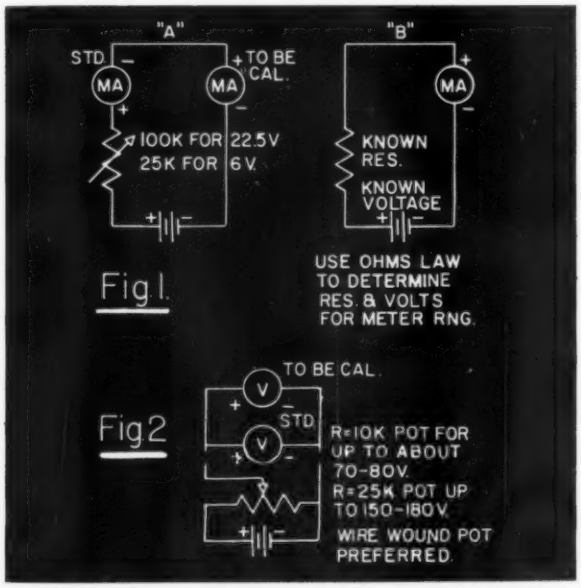
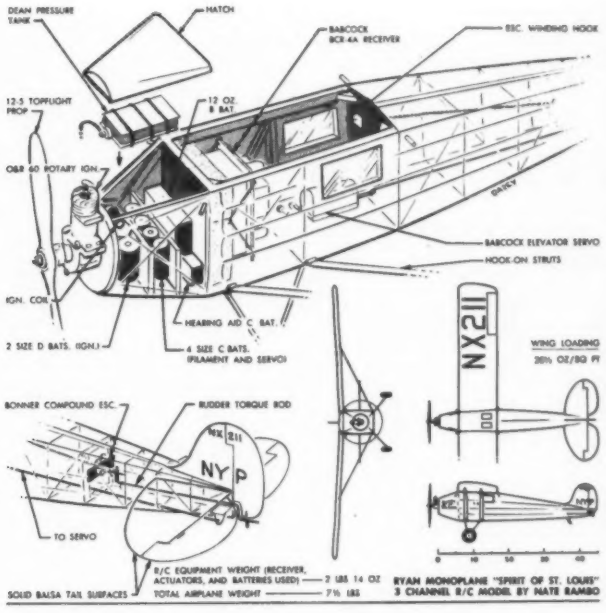


Figure 1 shows two ways to calibrate meter; Figure 2, for voltmeter.


DEAN PRESSURE TANK
HATCH
BABCOCK BCR-4A RECEIVER
ESC. WINDING HOOK
12-5 TOPFLIGHT PROP
12 OZ. R BAT.
O&R 60 ROTARY IGN.
BABCOCK ELEVATOR SERVO
HOOK-ON STRUTS
IGN. COIL
HEARING AID C BAT.
2 SIZE D BATS. (IGN.)
4 SIZE C BATS. (FILAMENT AND SERVO)
WING LOADING
NX211
BONNER COMPOUND ESC.
RUDDER TORQUE ROD
TO SERVO
R/C EQUIPMENT WEIGHT (RECEIVER, ACTUATORS, AND BATTERIES USED) 2 LBS 14 OZ.
TOTAL AIRPLANE WEIGHT 7½ LBS
SOLID BALSA TAIL SURFACES
RYAN MONOPLANE "SPIRIT OF ST. LOUIS" 3 CHANNEL R/C MODEL BY NATE RAMBO

New six-arm escapement is ideal for trim and engine control work.

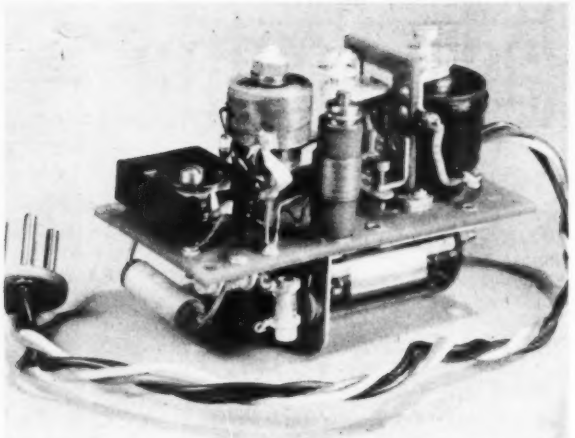
CLUB NEWS

The Indianapolis Radio Control Modelers has over 60 paid-up members which, as far as we know, is just about a record. Anyone in Central Indiana is invited to join the club or participate in the contest and flying this summer and should contact C. C. Trout, Secretary, 2234 N. Goodlet Ave., Indianapolis, Ind. Flying is done at Stout Field, which is an inactive military base and, needless to saw, the 400 acres and paved runways make for an ideal flying site.

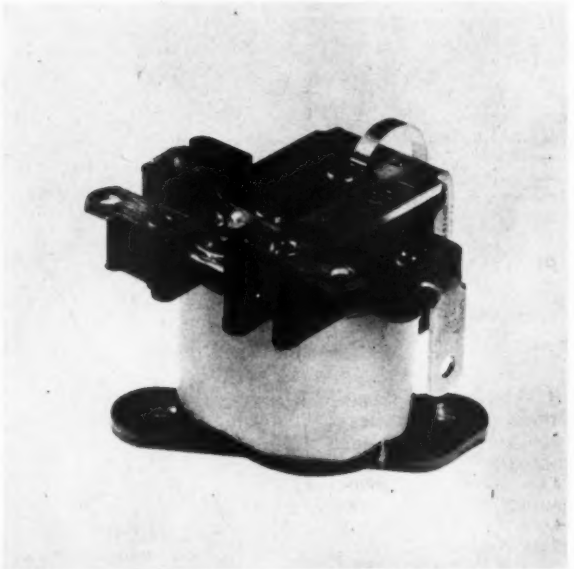
A short report on an RC meet in Pheonix, Ariz., back in February, by Frank Hoover of CG Electronics, indicates that the reliability of RC equipment is going up all the time. No fly-aways were reported and no interference was noted, although engine trouble reared its ugly head at times. Of the approximately 40 entries, half were rudder-only. Colby Evett of California took first in multi-channel with R. Schellenbaum of Albuquerque taking second. H. Dobkins and Dub Fisher, both of Albuquerque, took first and second

CONTINUED ON FOLLOWING PAGE

To check audio output receiver, CG doped out transistorized receiver, less relays. Miniature earphone replaces reed bank. Bats in case.



Hard-tube receiver by Lafayette checked out well to ranges of 500 feet on ground. It operates on B batteries having 45 to 67½ volts.



Typical of many relays that operate reliably at higher currents, as for reed bank receivers, is the Sigma 11F. Minimum 1.5 to 2.5 ma.

in rudder-only. In his Torp .29-power Blitzen Frank uses a combination exhaust throttle and intake choke to provide engine speed control. The system is actuated by a PN type of actuator and provides speeds for idling, cruise and stunt.

We hope you'll be able to attend the RC contest at the Turlock Municipal Airport, Turlock, Calif., on June 9 and 10. Galen Rydelius, 1666 Margaret Way, Ceres, Calif., Secretary of the Aerial Robots of Modesto, reports that there will be classes for rudder-only, single-channel and multi-channel. In view of this, we should be getting quite a variety of "Mickey Mouse" arrangements. Those of you in the vicinity of DeKalb, Ill., may want to take in the contest by the DeKalb Cloud Dusters on June 17. Contact Cyril Bauer, 220 Edward St., Sycamore, Ill., for further details on this contest which will try to give RC merchandise rather than trophies.

W. R. Sheehan, publicity man for the Flying Sparks, Inc., 1260 W. Church St., Elmira, N. Y., sent in a clipping from the local paper, giving a run-down of the report by the FCC to a letter sent to local Congressmen. This club contacted their Congressmen (Rep. W. S. Cole and Sen. I. M. Ives) who turned to the FCC to see what could be done about the crowded situation on 27.255 mc. The sum and substance of the reply by the FCC is that they are aware of the interference problem and that they have under consideration a number of proposals to remedy it. No mention was made of the nature of the proposals. At least this shows that a little effort on the part of clubs and individuals will bring results. This is the second evidence of action being taken along this line. Can we report your club in the active ranks next month? Think what it would mean to have a frequency at about 13 mc, another at 27.255 mc, another at 40 mc, a whole band for "hams" at 50-54 mc and also 465 mc.

L. R. Purdy, Box 329, Smyrna, Ga., has a fine sheet made up, giving pros and cons on rudder-only vs. multi-channel. He points out that the important thing to remember is not how much the radio equipment costs but how well you know how to use it and fly your ship and the ingenuity used in making control hook-ups. The thing which stands out as far as good multi-channel flying is concerned is that the flier has learned to master his equipment and plane. The same thing applies to a plane employing a single-channel receiver which is arranged to give a multiplicity of control functions. Let's not give the newcomer the impression that it requires a multi-channel receiver to make a successful flight. At the same time, we don't want to give the impression that multi-channel equipment is not efficient. We still favor a class of rudder-only, which gives the newcomer a chance in competition; a single-channel class which allows the beginner to advance and use some ingenuity without spending large sums of money; and the multi-channel class for the advanced builder.

TECHNICAL TOPICS

Ever wonder about a unit to check the audio output of your transmitter? Here is a very simple, but most effective, method for building such a unit. This piece of equipment consists of a CG Electronics transistorized reed receiver, minus the reed bank and the relays. In place of a reed bank you insert a miniature earphone. The entire unit is built into a plastic case, including the 1½ volt pencell and a single sub-miniature 22½ or 30 volt hearing aid battery. The Telex 1,000 Ohm hearing aid receiver is driven by a T-42 transformer, which is inserted in place of the reed bank. However, we have found that a Lafayette earphone, No. MS-111, works satisfactorily without the transformer's coupling. A 2 ft. length of wire serves as an antenna, although a report has come in that, when using a 4 ft. antenna and tuning to 10 meters, a South American station was picked up on the CG five-channel set. If longer filament battery life is desired, (*Continued on page 37*)

Old measurement one end, new at the other. Use various bolt holes, marked for scales.

proportional dividers . . .

By PAUL E. DEL GATTO

For enlarging plans here is a tool worth weight in gold.

► Did you ever get a hankering to scale up a three-view, or enlarge a set of plans of some hot contest design? Sure you did! But more than likely you don't have any tools to work with except for a pencil, ruler and some paper. The thought of spending a few dollars for some of the essential tools usually squelches enthusiasm.

Yet most (*Continued on page 39*)

POINT SHOULD TOUCH

POINT DETAIL FOR WOOD ASSEMBLY

POINT DETAIL FOR METAL ASSEMBLY

NOTE: DIVIDERS CAN BE MADE FOR EACH INDIVIDUAL SCALE. ELIMINATE PIVOT HOLES NOT BEING USED.

3/16"x 5/8" HARDWOOD SHOWN. FOR METAL DIVIDERS, USE APPROXIMATELY 1/16" BRASS.

3/8"

1/2"

DRILLED HOLES TO SUIT SIZE OF BEARING BOLT USED.

3"

1/4 OR 4X SCALE

1/3 OR 3X SCALE

1/2 OR 2X SCALE

2/3 OR 3/2 SCALE

3/4 OR 4/3 SCALE

THREE TO FOUR WASHERS

PIVOT HUB ASSEMBLY DETAIL

NOTE: EXACT OUTLINE, WIDTH, THICKNESS AND CHOICE OF MATERIALS CAN BE MODIFIED. HOWEVER, OVERALL LENGTH AND POSITION OF PIVOT HOLES SHOULD BE VERY ACCURATE. MAINTAIN SAME PROPORTION IF DIVIDERS ARE REDUCED OR ENLARGED IN SIZE.

6"

FULL SIZE LAYOUT

PLASTIC MIGHT ALSO BE USED FOR DIVIDER LEGS.

1 CUT OUT TWO BLANKS FOR DIVIDER LEGS.

2 LOCATE PIVOT HOLES AND DRILL THROUGH.

DRILL

3 CONVERT SMALL FINISHING NAILS INTO NEEDLE POINTS.

CUT OFF HEAD AND FILE IN TAPER.

BEND FOR WOOD ASSEMBLY.

BOLT

LARGE FACE WASHER

4A DRILL HOLES AT EACH END AND PRESS FIT NEEDLES IN TIP FOR WOOD ASSEMBLY.

SOLDERING IRON

SOLDER

SOFT WIRE

PLIERS

4B BIND AND SOLDER NEEDLES AT EACH END FOR METAL ASSEMBLY.

LARGE FACE WASHER

LOCK WASHER

NUT

5 ASSEMBLE DIVIDER LEGS AS SHOWN WITH THREE TO FOUR BEARING WASHERS IN BETWEEN LEGS.

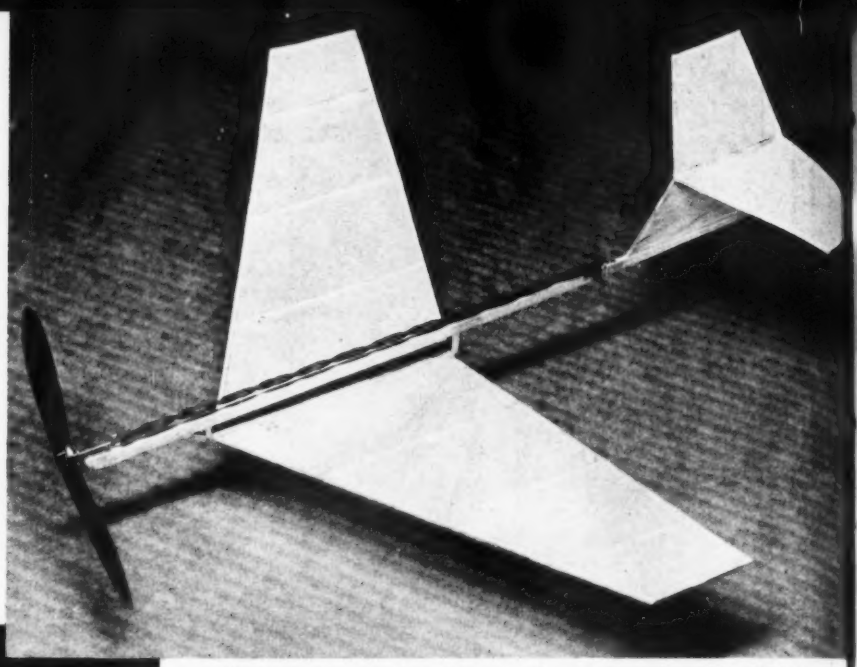
ASSEMBLY DETAILS

P.D.G.

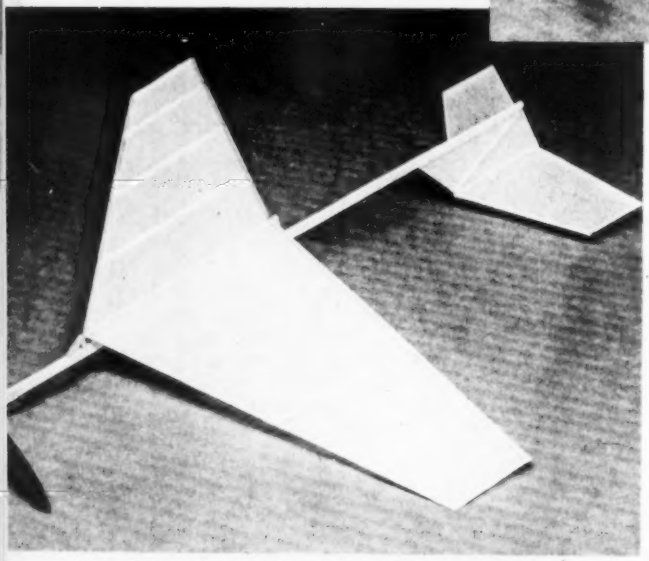
SWIFTY

By JOHN ZAIC

Teach yourself how to fly a model with this simple craft. If you already know, make it for fun and laughs. Uses hobby shop parts and prop.

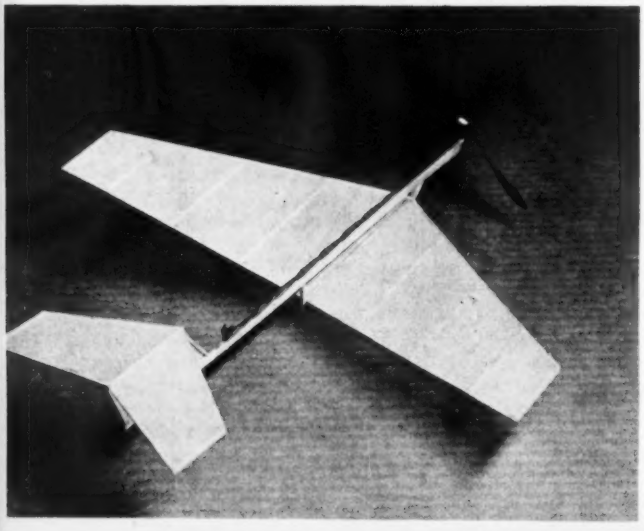


Paper is not sprayed or dope coated on such small models. Builder used nail polish to attach paper edges—because of the small brushes!



Inverted view. Cover model in temperature approximately same as that where it will be flown—paper pulls when warmed, loosens when cooled.

Wind up the prop, lay model on floor, and it takes off without a landing gear. Breath on surfaces and twist slightly to adjust turn and bank.



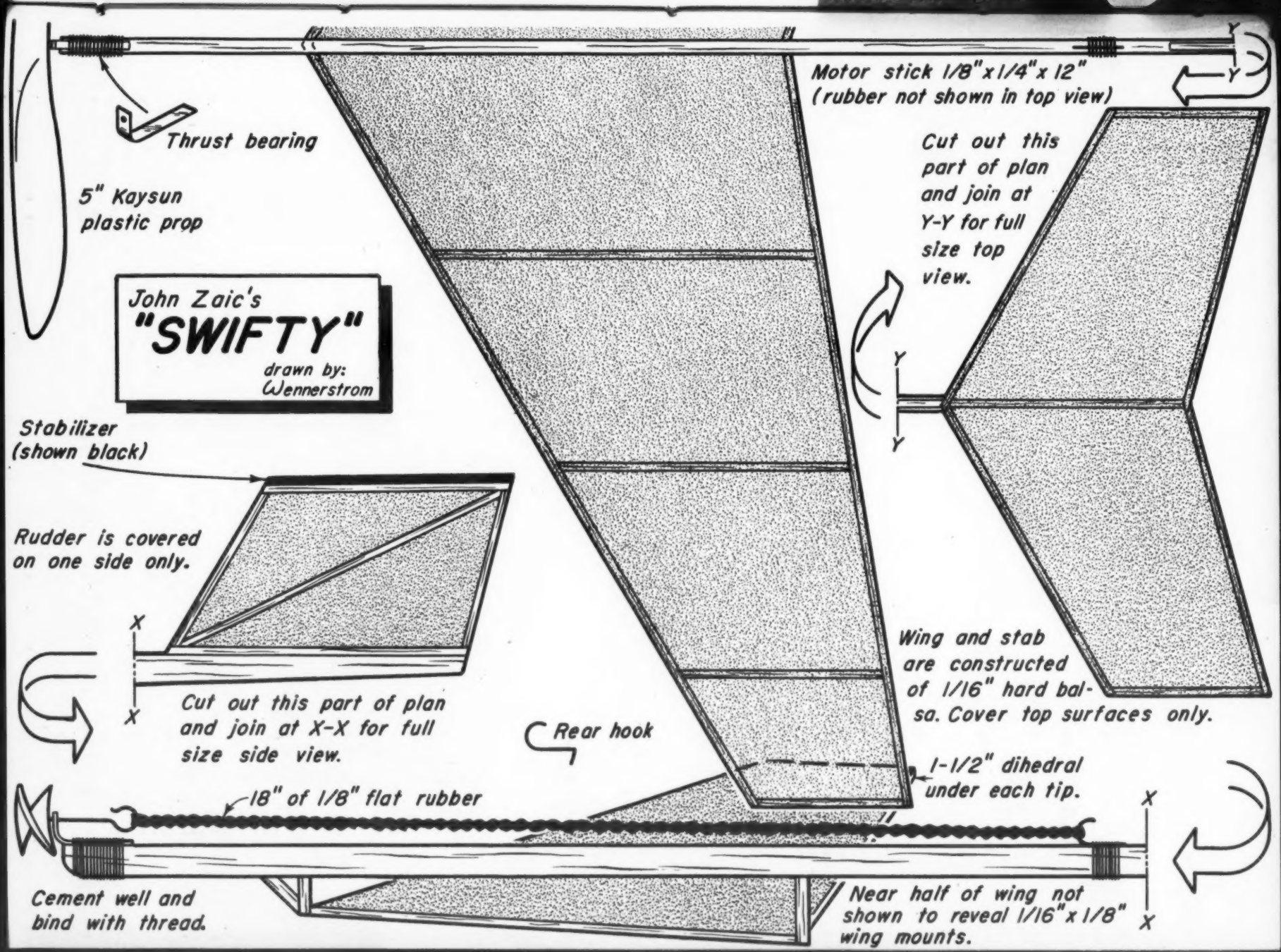
► Simplicity is the keynote of the design of this little rubber-powered flying model airplane called Swifty. Models can never be made simple enough for beginners, so all frills in construction were eliminated. A landing gear was originally put on the model but later removed. It was surprising how much the performance of the model was improved.

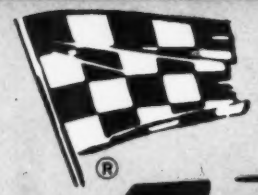
The Kaysun plastic propeller used was more than strong enough to take the shocks. You can buy this "5" plastic rubber model prop from your local model shop. It is possible for the model to take off from the ground, too. Just wind up the propeller, lay the model down and see how the propeller first beats against the floor and then suddenly pulls the model into the air.

The wing is cemented to the fuselage and, taking a tip from the glider experts, use modeling clay to balance the plane for flight. Very little is needed to bring the model into flying trim. If tail-heavy—that is, the model stalls when hand-glided—add modeling clay to the nose until a steady glide results.

The wing and tail are made of 1/16 sq. balsa. The ribs are cut out first. Then the wing spars are cut to a length about an inch greater than required. Using your fingernails, split the spars in half but do not break them completely apart (look at the top view of wing and you can see why). Put the front wing spar on the drawing and bend it to the desired angle. Place straight pins along the balsa strip to hold it in position. Don't put pins through the wood. However, before doing this, rub dry soap over the drawing to prevent the work from being cemented to the drawing. Cement the large center rib and then the two tip ribs to the front strip. Wait a while for the cement to harden and then add the rear wing spar and the rest of the ribs. Use plenty of pins to hold the parts in place. The rudder and the stabilizer are made in the same manner.

After the parts have been made, they are removed from the drawing. If they tend to stick to the drawing, slip a razor blade between them and the drawing. The wing is then given a dihedral angle. This is done by cutting slightly the bottom middle of each wing spar and breaking the spars upward slowly to form the dihedral. Apply cement to both joints, wait a moment, lay one wing-half flat on the table and put a book on it to hold it *(Continued on page 43)*


Thrust bearing
5" Kaysun plastic prop
John Zaic's
"SWIFTY"
drawn by: Wennerstrom
Motor stick 1/8"x1/4"x12" (rubber not shown in top view)
Cut out this part of plan and join at Y-Y for full size top view.
Y
Y
Stabilizer (shown black)
Rudder is covered on one side only.
X
X
Cut out this part of plan and join at X-X for full size side view.
Rear hook
Wing and stab are constructed of 1/16" hard balsa. Cover top surfaces only.
1-1/2" dihedral under each tip.
18" of 1/8" flat rubber
X
X
Cement well and bind with thread.
Near half of wing not shown to reveal 1/16"x1/8" wing mounts.



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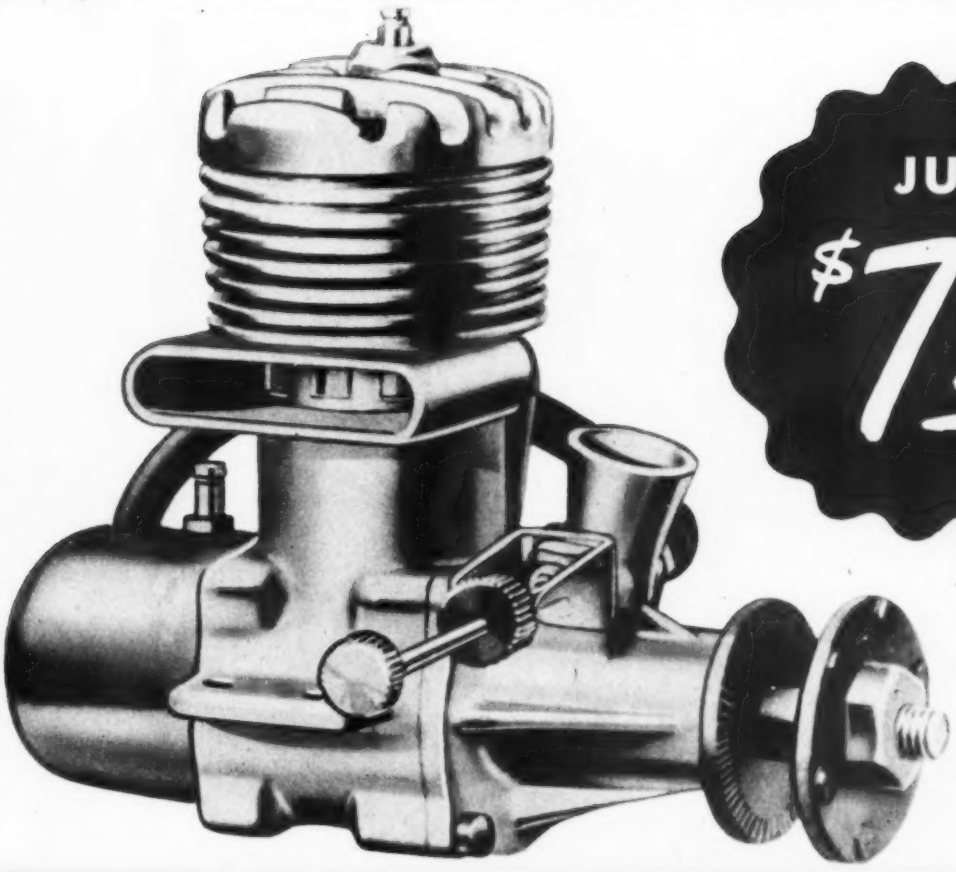
DURO-MATIC PRODUCTS COMPANY DIVISION

Super Stunt 9



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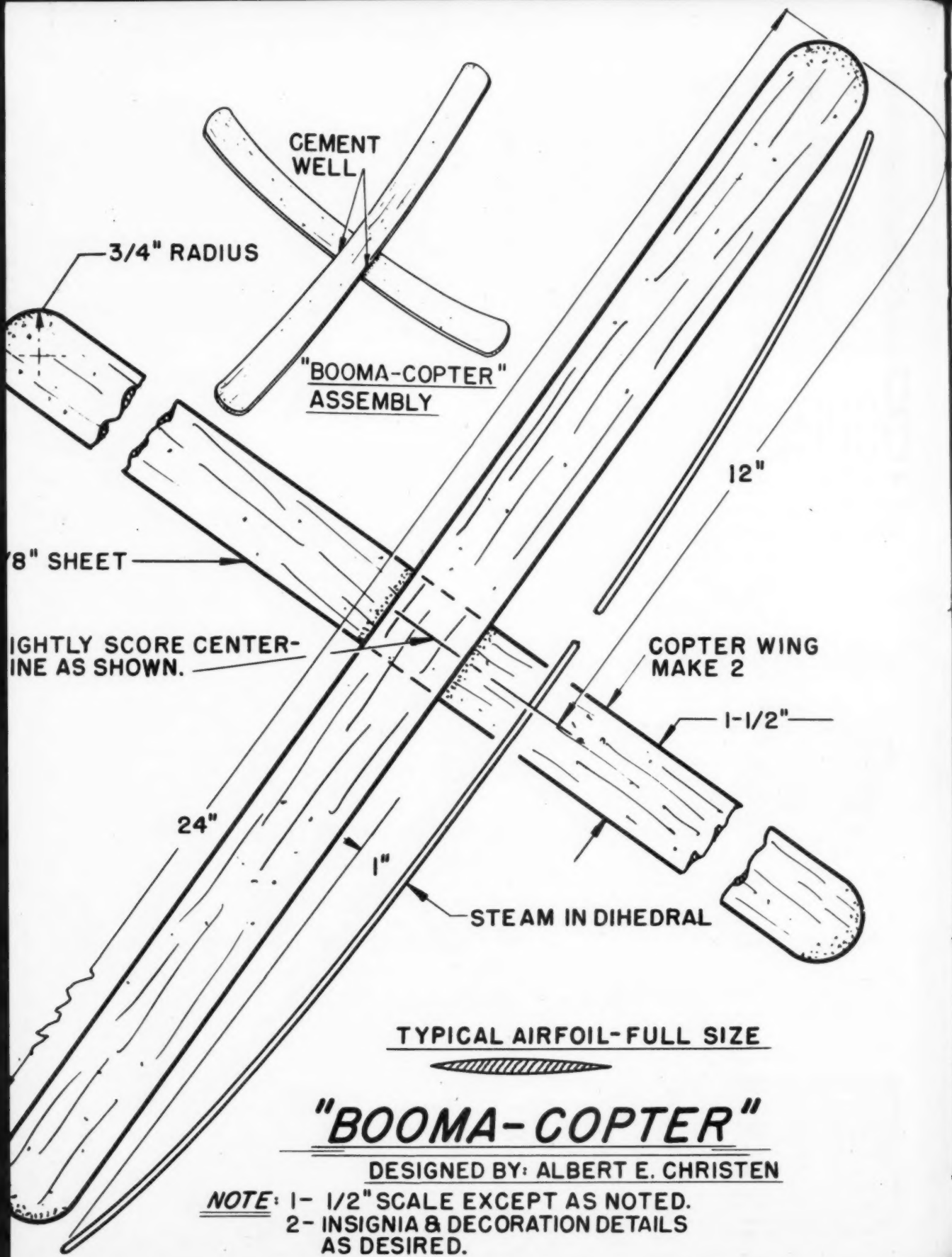
"Micro-Five" slug pistons — "McCoy's Military Secret" — in McCoy Super Stunt engines are machined and micro-finished to tolerances of 5 millionths of an inch — in both concentricity and size. This assures perfect fit of every McCoy piston and sleeve, interchangeability of parts, and minimum break-in. New fuel flow system gives 17-inch fuel draw for smooth, even running during stunt or combat maneuvers.



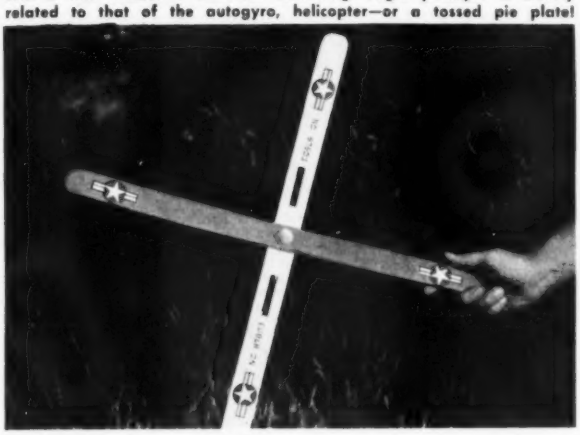
TYPICAL AIRFOIL-FULL SIZE

"BOOMA-COPTER"

DESIGNED BY: ALBERT E. CHRISTEN

NOTE: 1- 1/2" SCALE EXCEPT AS NOTED.
2- INSIGNIA & DECORATION DETAILS AS DESIRED.

This is how model is held for launching. Flight principle is closely related to that of the autogyro, helicopter—or a tossed pie plate!



Start of a flight. Experiment with ways to launch for best results.

Booma-Copter

By ALBERT E. CHRISTEN

Even the aborigines can't make thermal-riding boomerangs. RC'ers—this a rest cure!

► This aerial what-not looks like a boomerang and flies like a helicopter. It is easily made in a few moments from ⅛ sheet stock and will provide lots of fun for little money.

The Booma-Copter shown in the photos has had over 100 flights and every kid in the neighborhood has had at least one turn at it.

We made up several models for small-fry distribution so we could have a few turns ourselves.

Brute force is not required for best flights. One seven-year-old in our neighborhood can get over 50 ft. of altitude with a flick of the wrist and a little heave.

The 'Copter shown was colored red and yellow and insignia and numbers were dug out of the scrap box.

So invest 30c and 30 minutes of your spare time and become a Booma-Copter pilot.

Bill of Materials

1 piece ⅛ sheet balsa, 3 by 36 long; cement, Sanding Sealer, dope, insignia, numerals, sandpaper.

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February 19, 1956

WINNERS WITH JOHNSON ENGINES

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1st Junior Stunt . . . Dennis Alford
6037 Madrone, San Diego, Calif.

2nd Junior Stunt . . . James Ivey
1321 W. 218 St., Torrance, Calif.

2nd Combat . . . James Hudson
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HERE ARE THE WINNERS

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James Ivey

James Hudson

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. . . Hop-Up Your Green Case Johnson .35 . . . For Only $1.50. Send your engine and money order. Engine returned same day received, returned Post Paid.

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- Jet Engines for Both

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HIGH WING TRANSPORT
The JETLINER

Engine mounted below; big 16½" wing span cambered for high performance in loops, climbs or level flight. Adjustable wing setting. Complete with #50B engine and fuel.....$1.59

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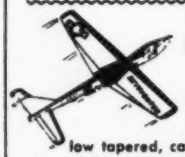
MID-WING
EXECUTIVE TRANSPORT
The SWALLOW

Jet engine mounted above and behind cabin. 15" span. Longer range, higher speed, true jet action. Ruggedly built. Adjustable wing setting. Complete with #50B engine and fuel. $1.59



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The
SKYFIGHTER

Engine mounted below tapered, cambered wings. 13½" span. Solid, fast, stable in weather that grounds most models. Adjustable wing setting. Complete with #50B engine and fuel. $1.59

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Pre-formed fuselage, die-cut balsa parts, sandpaper, plastic canopy. Air Force decals, assembly and flying instructions. Complete kit 98c

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12" augmenter tube available separately .95

FUEL PRICES INCLUDE
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No. 35 Fuel —	8 pellets	$ .65
No. 50 Fuel —	6 pellets	.65
No. 50 Fuel —	15 pellets	1.25
No. 150 Fuel —	10 pellets	1.40
No. 600 Fuel —	10 pellets	1.95

AMERICAN TELASCO, Ltd.
HUNTINGTON, NEW YORK

P. G. F. CHINN

FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

Western Germany

Interesting news comes from Heppenheim, Bergstrasse, of a new transistorized receiver built by G. Brunnenkant which, with transmitter, is being put into production. Known as the Roboter-1000, this is the first European receiver to use a transistor. The set operates on a 60-volt B supply and has two miniature tubes (Continental DL.651's) and one transistor (OC.601). Along with potentiometer, it is housed in a transparent plastic case 2.6 x 1.8 x 1.6 in. and weighs 2.2 oz. We hope to have one of these sets to report on at a later date.

The 27.12 mc transmitter operates from a 150-volt dry battery supply and is claimed to have an effective range of ¾-mile, with the Roboter-1000 receiver, on an output of 1 watt. It weighs just under 3 lb. with batteries.

Also put out in small quantities by this same manufacturer is a highly interesting twin-cylinder Diesel, designed especially for radio control work and for use with Stegmaier's pneumatic control system in particular, the rear of the crankcase incorporating a pump unit. This motor has horizontally opposed cylinders and a displacement of 6 cc (.36 cu. in.). Essentially a custom-built effort, it is priced at around DM.180, or about $42.00.

Latest Italian Super-Tigre is .35 G.21, for combat and stunt. Performance, rugged construction.

East Germany

As every free flight contest gas model enthusiast knows, it is easy to trim a model to glide well. It is not quite so easy to trim it to climb well. But the really difficult part comes in trimming the model both to climb and glide satisfactorily on the same combination of adjustments. However, contestants do achieve it and practically all the most important contests on both sides of the Atlantic have been won with models with fixed trim.

Nevertheless, from time to time, someone comes forward with some sort of mechanical set-up for altering the elevation of the model in the transition from climb to glide. We have seen timer operated gadgets for altering stab angle and similar gimmicks which shift the CG. Now, in an article picturesquely entitled *Das Steigflugproblem und der Versuch Seiner Lösung* (meaning, roughly, "the climb-flight problem and experiments on its solution"), East German National Champion Hans Neelmeijer puts forward a somewhat complicated arrangement for altering the angle of incidence of the wing.

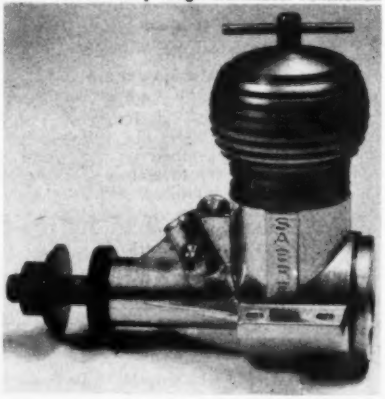
Using a system of pawls and levers enclosed in the pylon, with the wing pivoted, see-saw fashion, and operated from a timer, this actually gives three adjustments. On take-off, the wing is inclined at a small angle (about 1½°) while, in the climb, this is reduced to zero. In the glide the wing then rocks back again, increasing its angle to about 2°. The idea is ingenious but, perhaps, rather vulnerable to damage and seems unlikely to find favor unless clear proof of superior model performance is forthcoming.

Italy

A new engine from the noted Italian Super-Tigre factory is always an event. Just received from there (as foreshadowed in our April column) is the entirely new G.21(35). This has little resemblance to the existing .29 cu. in., ball-bearing G.21 which is basically a racing model. The new .35 cu. in. G.21 is intended primarily as a stunt and combat engine and follows the accepted formula, for this class, of plain bearing (bronze bushed), lapped piston and shaft valve induction with the spray-bar placed close to the valve port. It should prove a worthy contender alongside other .35's in this now quite well-represented displacement class.

Constructionally, the .35 follows usual Super-Tigre practice in its use of a one-piece crankcase and cylinder block with fixed backplate and a detachable main bearing housing, flange and boss fitted to the crankcase. Mating surfaces are machined, no gaskets being used. The cylinder liner is an excellent slip fit in the block, the top being flanged and with a narrow raised rim upon which the die-cast and machined head seats via a pair of annealed copper gaskets to eliminate effectively the risk of a blown head joint. Six cylinder head screws are used. The whole

Australian Sabre .15 Diesel engine features nice finish and a really tough crankcase. Functional.



Neat RC pusher by Flt. Lt. Eric Cable, RAF. Torp .15 power, Bramco throttle, deBolt 3PN servo.

motor is a really rugged job, the front bearing assembly being particularly massive.

Argentina

It appears that the recent political upheaval in the Argentine may contribute some changes to modeling conditions there, according to one of our correspondents, who foresees some relaxation of the restrictions on balsa, etc. The FAI world championship classes (Wakefield rubber, FAI power, A.2 glider) are being taken seriously and to a point where virtually all contests are now to FAI rules.

Our old friend Dick Carlstein, in Buenos Aires, tells us that a lot of good flying is still being done in the Wakefield class, with at least a half-dozen chaps making a consistent three-minute "still air" (6 a.m.). This is particularly noteworthy in view of the fact that good contest rubber is scarce and has still to be used when tired, thus reducing potential model performance. FAI free flight is very popular, but generally below international standards of performance as yet, one of the retarding factors being that few exponents of the art have learned the technique of trimming for a smooth transition from power to glide. In A.2, some enthusiasts have tried the German stick fuselage type with good results.

India

In much of India there exists Prohibition. It might be supposed that this would be of little consequence to the average model builder, but, in fact, it proves quite a handicap since it also means that methyl-alcohol, an essential ingredient of all modern glow plug fuels, is unobtainabe. We hear of model builders in various parts of India unable to use their motors because of this ban, whereas the members of the All-India Aeromodellers Ass. in Calcutta, as in a few other "wet" towns, apparently do not experience the same difficulties. This seems to be a case where something ought to be done for the bona fide model builder. We see no reason why pharmacists should not be allowed, in such cases, to sell methanol adulterated with 20 or 25 per cent castor oil.

England

Flt. Lt. Eric Cable, RAF, one of Britain's best RC men and a noted exponent of unconventional RC design, has just completed a highly interesting new pusher which has been developed through three models. Ship features three-tube tone receiver, separately mounted Sigma relay and deBolt 3PN servo giving selective rudder, plus motor control via a second actuator, and Bramco throttle on a Torp 15. Span is 60 in.; chord, 10 in.; weight, 4 lb. Model breaks down into easily transportable units and features easy inspection of, and access to, radio gear through a large removable transparent canopy.

Thailand

With the ban on the import of kits and engines now lifted (though still subject to a 75 per cent (*Continued on page* 48)

Lafayette Brings You A Super Value

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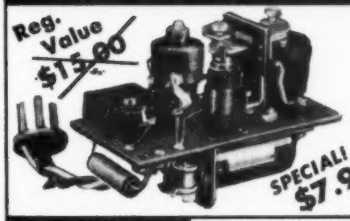

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Sigma 4F Relay ..... Net 3.95

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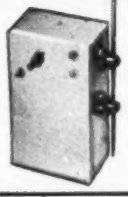

Described in December 1954 Issue POPULAR ELECTRONICS

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The Lorenz Remote Control Transmitter is a highly efficient instrument designed to operate on the exam free "Citizen Band" frequency of 27.255 megacycles. The only F.C.C. regulation is that an F.C.C. form 505 (supplied with kit) be filled out and sent to the nearest F.C.C. office.
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Contest Calendar

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JUNE

2- 3 *Santa Ana, Calif.:* Class AAA 3rd Annual California Model Airplane Championships for CL, CLS, CLFS, NC, CLC, FFG, FFFS, TLG, OR. H. N. Parker, C.D., 1028 W. 87th St., Los Angeles 44, Calif.

3 *Berwick, Pa.:* Class AA Busy Bees' Model Air Meet for FFG, CLS, rat racing. Charles T. Cooper, C.D., 531 Broad St., Nescopek, Pa.

3 *Goodland, Kan.:* Class AA Northwest Kansas Gashoppers' Model Airplane Meet for RC, FFG. Kenneth Armstrong, C.D., Goodland, Kan.

3 *Cleveland, O.:* Class AA 5th Annual Free Flight Flying Scale Meet. John W. Grega, C.D., 355 Grand Blvd., Bedford, O.

3 *Buffalo, N.Y.:* Pending

3 *Lansing, Mich.:* Class AA Lansing Free Flight Fair for FFG. John E. Pfeifer, C.D., 1342 N. Jenison, Lansing, Mich.

3 *Galesburg, Ill.:* Class AA 12th Annual Memorial Day Championships for CLFS, TR, CL and CLC. Kenneth R. Johnson, C.D., 350 Park Lane, Galesburg, Ill.

3 *Lakehurst, N.J.:* Indoor Record Trials. Tony Becker, C.D., 2212 Griffith St., Philadelphia, Pa. Pending.

10 *Tulsa, Okla.:* Class AAA 1st Annual Southwest Scale Contest for FFFS, CLFS. Willard H. Kerr, C.D., 4940 N. Johnstown, Tulsa, Okla.

10 *San Diego, Calif.:* Class AA Team Racing Contest. Lee McBrayer, C.D., 101-B Elm St., Alhambra, Calif.

10 *Easton, Pa.:* Class AA Model Airplane Doctors' 4th Annual Air Meet for FFG, OR, TLG, OHLG, RC, CLS, CLC, CL, obstacle course. Russ R. Sottosanti, C.D., 1113 Keane St., Easton, Pa.

10 *Elmira, N.Y.:* Class AA Flying Sparks 3rd Annual Radio Control Meet. Fred Greenall, C.D., RFD 2, Horseheads, N.Y.

10 *Cedar Rapids, Ia.:* Class AAA 10th Annual John Pavlis Memorial Model Airplane Contest for OHLG, TLG, OR, FFG, RC, PL. Paul M. Marchal, Jr., C.D., 1837 8th Ave., S. W., Cedar Rapids, Ia.

10 *Corpus Christi, Tex.:* Class AA Corpus Christi Annual Free Flight and Radio Control Contest for FFG, FFFS, OR, OHLG, RC. Bert A. Bottomstone, C.D., 450 Homecrest, Corpus Christi, Tex.

10 *Osawatomie, Kan.:* Class AA Osawatomie Modeleers' 2nd Annual Model Meet for CL, CLS, CLC, RC. Howard M. Myers, C.D., 131 Pacific, Osawatomie, Kan.

10 *Harvey, Ill.:* Class AA Chicago U-Liners' Annual Contest for CLC. E. M. Holzbach, C.D., 14510 S. Union Ave., Chicago 27, Ill.

10 *Belleville, Ill.:* Class AA Belleville Fying Dutchmen Model Airplane Contest for CL, CLS, CLFS, CLC, NC. Richard M. Valentine, Jr., CD., 512C Gunn, Apt. 773, Scott AFB, Ill.

10 *Napoleon, Mich.:* Class AA Jackson Radio Control Contest. David R. Maricle, C.D., 148 W. Main, Milan, Mich.

10 *Durham, N.C.:* Class AA Durham Exchange Club Meet for rat racing, CLS, CLC, proto speed. H. C. Stamper, Jr., C.D., 913 Second St. Durham, N.C. Pending.

10 *Las Alamitos, Calif.:* Class AA Thunderbugs' 4th Annual PAA Meet for PL, CC. Richard McGrath, C.D., 5829½ Olive, Long Beach, Calif.

16-17 International Competition Semi-Finals at Norfolk, Va.; Tulsa, Okla.; Galesburg, Ill.; a West Coast site to be announced.

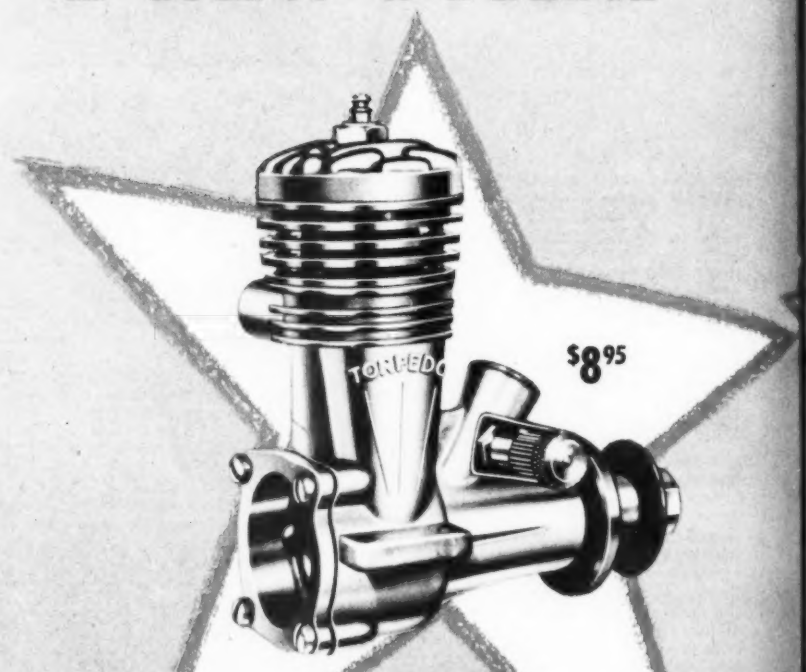
16-17 *Spartanburg, S.C.:* Sky Knights' Record Trials for all free flight and controlline classes. Robert S. Gaddis, C.D., 138 Morgan Sq., Spartanburg, S.C.

16-17 *Kansas City, Mo.:* Class AAA Kansas City Radio Control Annual Meet for RC. Paul F. Runge, C.D., Box 301, Higginsville, Mo.

16-17 *Knoxville, Tenn.:* Class AAA Second Annual Tennessee Exchange State Model Meet for FFG, OR, TLG, CL, CLS, CLFS. Hugh D. Powers, C.D., 1165 Marshall Rd., Maryville, Tenn.

16-17 *San Antonio, Tex.:* Second Annual Alamo Regional Contest.

2 NEW STARS



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17 *Moses Lake, Wash.:* Pending.

17 *St. Clair Shores, Mich.:* Class AA Emerald Harbor City Air Fair for CL, CLS, CLC, CLFS. Howard A. Lewis, CD., 21520 California, St. Clair Shores, Mich.

17 *Long Island, N.Y.:* Class AAA Gas Monkeys' 9th Annual Long Island Championships for FFG, Jetex, OHLG, OR, Edwin W. Howe, C.D., 5 Camdike St., Valley Stream, N.Y.

17 *Wichita, Kan.:* Class AA "Y" Wichihawks' 4th Annual Controlline Meet for CL, CLS, TR, CLC, proto speed. Jean P. Valle, C.D., 3208 S. Vine, Wichita 13, Kan.

17 *DeKalb, Ill.:* Class AA DeKalb Cloud Dusters' Radio Control Meet. Dutch Hess and Dale Hindenburg, C.D.'s, 137½ E. Lincoln, DeKalb, Ill.

17 *Richmond, Ind.:* Richmond Aviation Club Meet. For info: William J. Cox, 219 So. 32nd St., Richmond, Ind. Pending.

17 *Tulare, Calif:* Tulare Sky Kings' Record Trials for all free flight classes. Don Peacock, C.D., 912 Apricot, Tulare, Calif.

23-24 *Daytona Beach, Fla.:* Class AA Daytona Spring Model Plane Meet for FFG, OHLG, TLG, RC, CLS, rat racing, CLFS. William T. Thomas, C.D., 105 N. Halifax Ave., Daytona Beach, Fla.

24 *Hamilton, O.:* Class AA Hamilton Aero Club Meet for FFG, OHLG, OR. Walter L. Weber, C.D., 435 Dick Ave., Hamilton, O.

24 *Detroit, Mich.:* Class AAA Annual Michigan State Exchange Clubs' Model Airplane Meet for FFG, CL, OR, TLG, CLS, CLC, TR, PL, RC. Entry restricted to residents of Michigan. Frank P. Sposite C.D., 8904 Woodward Ave., Detroit 12, Mich.

24 *Hagerstown, Md.:* Class AA 6th Annual Hagerstown Model Flying Circus for CL, CLS, TR, CLC, FFG, RC, OR, TLG, OHLG. John Young, C.D. For info: Exchange Club of Hagerstown, Box 292, Hagerstown, Md.

24 *Houston, Tex.:* Class AAA Houston International Model Airplane Contest for FFG, CL, CLS, CLC, RC, TLG, OHLG, OR. Paul I. Brown C.D., 3023 Durwood, Houston 16, Tex.

24 *Meriden, Conn.:* Class AAA Connecticut State Controlline Championships for CL, CLFS, CLS, CLC. Chester A. Orrill, Jr., C.D., 47 Carpenter Ave., Meriden, Conn.

24 *White Plains, N.Y.:* Class AA Exchange Club's 2nd Annual Model Aviation Meet for FFG, RC, CLC, CLS, OR, OHLG. A. E. Lehmberg, C.D., North Salem Rd., Ridgefield, Conn. Pending.

24 *Taft, Calif.:* Taft Model Airplane Club Record Trials for FFG. H. E. Owen, C.D., 417½ Van Buren St., Taft, Calif.

24 *Fresno, Calif.:* Fresno Gas Model Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

24 *St. Paul, Minn.:* Class AAA Minnesota U-Control Championships for CLS, CLC, CLFS, CL, TR. Keith V. Lightfoot, CD., 3634 White Bear Ave. White Bear Lake 10, Minn.

24 *Harvey, Ill.:* Class A RC3 Flying Meet for RC. Restricted to members of Radio Control Club of Chicago. R. E. Webb, C.D., 1303 W. 79th St. (1621 E. 87th St. after June 1), Chicago, Ill.

30-July 1—*New Orleans, La.:* Class AAA 15th Annual Gulf States Model Meet. Paul A. Burvant, C.D., 77 Spanish Fort Blvd., New Orleans 24, La. Pending.

JULY

1 *Chicago Ill.:* Class AA 4th Annual Chicago Prop Nutz' Flying Meet for OHLG, OR, TLG, FFG. Peter J. Sotich, C.D., 3851 W. 62nd Pl., Chicago 29, Ill.

1 *Boone, Ia.:* Class AA 2nd Annual Boone Buzz Bugs' Model Meet for FFG, TLG, CLS, CLC, CLFS, RC. Harold W. Thies C.D., 1406 Monona St., Boone, Ia.

1 *Tulsa, Okla.:* Class AAA 3rd Annual Nordic Championship Contest for TLG. Willard H. Kehr, C.D., 4940 N. Johnstown, Tulsa, Okla.

1 *Collegeville, Pa.:* Class AA Cross Key Hawks' 2nd Annual Meet for TR, CLC, CLS, CLFS, NC, CL, destruction derby. Harry W. Hallman C.D., 2000 Markley St., Norristown, Pa.

1 *Minneapolis, Minn.:* Class AAA 8th Upper Midwest PAA—Load Meet for PL, TLG, Jetex, RC. Walt Billett, C.D., 4 West 26th St., Minneapolis, Minn.

1 *Celina, O.:* Class AA Flying Hor-

(*Continued on page* 44)

Berkeley's R.C. FLYING SCALE

2" Scale — 68" Wingspan

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NAVION "Super 260"

For .29 to .35 Engines Radio Control
For .23 to .29 Engines Free-Flight
For .29 to .65 Engines Controline

This beautiful scale replica of the famous "Navion" is a fast, rugged and truly different R.C. or Free Flight design, easily adapted to Controline flying. Thrill to its flashing performance and smooth response. As a free-flight, it will give you experience and confidence in low wing designs. Big, roomy, and well engineered, it will set the pace wherever it's flown. Easy to build!

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Variable Camber Wing For Two-Speed Radio Control Flying
For .049 to .14 Engines — 39" Wingspan — 1" Scale

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This high aspect-ratio Canadian Bush Flying type aircraft now is in use by the U. S. Air Force. As a scale design, it is well proportioned and capable of contest performance. In R.C. and Controline flying, its long moment arm make it ideal for spot landings with motor control. Metal Cowl, Full Size Plans, etc.

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By E. C. MARTIN

CONCLUSION

the man .19

All readers will find much useful information in these comments on engine break-in.

► Breaking in any type of machinery consists of wearing the surfaces together to obtain fits and finishes which are beyond the capabilities of the equipment used to manufacture the components, and also mating the surfaces under actual operating conditions of stress and deflection, which, being largely unknown, cannot be allowed for in manufacture. One cannot, for instance, easily measure the slight ovality of a cylinder bore in an engine turning at 10,000 rpm. We know ovality will be present because all materials give to some degree under the slightest load and, in the case of engines, the load on most components varies from a positive to a negative value with every stroke, and varies also in magnitude, according to the temperature and frequency of each operation. We therefore crudely manufacture as precisely as practicable and leave it to the machine itself to complete the process.

Break in is therefore a period of rapid initial wear and its rapidity and severity have a very definite bearing on the eventual performance and useful life of the machine. Engines undergo this process in most unfavorable conditions, as the heat which is their motivating force introduces an additional set of stresses and distortions which have to be accommodated. Additional heat produced by the rubbing of new microscopically rough surfaces makes temperatures shoot up beyond the designed values for the engine. Lubrication breaks down, more heat is generated by friction, parts expand and distort beyond limits, running clearances disappear and more and more heat is produced until the engine either seizes or chews its working surfaces into an easier fit.

At the end of this brutal business the engine will run freely and without overheating, and it will also run fairly well, but not for long, because the wearing-in has taken place at temperatures well in excess of those arising under normal conditions, distortion beyond the normal has been accommodated, and the engine has been partially worn out. The most important thing to observe, therefore, when breaking in a new engine, is that temperatures do not exceed those anticipated at full power after break-in. All other considerations are offshoots of this main maxim. The thing that most people will want to know is what procedure and circumstances will meet this condition.

Since friction between the working surfaces is the source of excessive heat, the first objective must be to control the friction within certain limits. However, the more friction and wear we can tolerate, the faster will be the break-in process. Therefore, let us establish a rough and ready standard for gauging the maximum allowable temperature during break-in. Seventy degrees Centigrade is about right and, as most people have no means of measuring accurately, the simplest yardstick that approaches that temperature is the hottest you can grip with your fingers without severe pain. This does not mean a quick reluctant squeeze, but a good hearty grasp of the cylinder and head fins lasting several seconds.

The degree of friction depends upon lubrication, rpm and load. A fuel with an oil content of one-third is ample for lubrication, but in model engines a high viscosity oil should be used, of between 50 and 70 grade, or castor. Many modern fuels contain synthetic oils which are excellent. However, some of the cheaper fuels contain a grade of synthetic which tends to gum the cylinder walls. Therefore, use one of the recognized superior brands of low nitro content for break-in if you cannot mix your own. It is a fundamental fact that the load capacity of a plain bearing increases with rpm up to a critical surface speed which, owing to the small size, is seldom reached in model engines. If the bearings are revolving fast under a given load, there will be less friction than if they were moving slowly with the same load. During break-in the engine should therefore be allowed to run at medium high revs, or about two-thirds of maximum.

That leaves us with the load factor to take care of. Many people keep the revs down by fitting a heavy coarse pitch prop. This is a mistake, as it actually increases the bearing loads in the engine. The condition to aim at is fast free turning with the minimum possible cylinder pressure, which necessitates the use of a light fine pitch prop of medium diameter. Rich mixture should be used to keep speeds down on a glow engine and lowest possible compression setting on a Diesel. As the engine loosens, these settings may be adjusted progressively, subject to temperature conditions, until prolonged flat-out running is achieved, when the engine can be considered broken-in.

Since friction determines the temperature and friction depends upon fits and finishes, the (*Continued on page* 40)

Radio Control News

(*Continued from page 24*)

use a Mallory RM-12R Mercury Cell.

Frank Hoover of CG Electronics Corp., Albuquerque, N.M., has the following information regarding the conversion of CG multi-channel equipment from 27 to 50 mc: remove the 10 mmf capacitor on the detector coil; reduce detector coil to 11 turns; reduce antenna coil to one turn and space it ⅛ in. from grid end; change grid capacitor to 50 mmf; change RFC to a 1W-10 meg resistor wound full with a single layer of No. 40 enameled wire; short out the 330 Ohm antenna resistor to prevent overloading the detector. To convert the transmitter, make the following changes: reduce the number of turns on the tank coil by one-half; remove the 10 mmf capacitor in the grid circuit; connect a 150 mmf capacitor in series with the ground end of the antenna coil; use a 50 mc crystal (see New Items). The antenna length should be 4 ft. and the range has been checked on the ground to one-quarter mile and three-quarter mile in the air. At extreme ranges, the maximum signal is obtained with your body between the transmitter and the receiver. Conversions can be made by the CG people, if you so desire.

Many readers have inquired what relay to use for specific purposes. Most of us who have been doing RC work consider: "Any sensitive relay will do the job." This may be true in some cases, but then let's review what is available for a particular job. This will be brief, since we plan to go into more technical details in a later column. A sensitive relay, such as would be used in the plate circuit of a single gas-tube or hard-tube receiver, is one which must operate on a small differential of plate current change and at a fairly low level. Relays which fall into this category are the familiar Sigma 4F's, 26F's, 5F's and the Potter Brumfield SS series. These relays have fully adjustable contacts and will operate reliably at minimum power levels and with current values of less than 1.5 ma. For two-tube operation, or for use in a circuit which gives a large current change, a less sensitive relay can be used. These still fall into the sensitive relay class, but will function reliably only at higher power levels. These relays include the Sigma series 41 and 11F, Neomatic, Potter-Brumfield series SM and PM, Price, ED Standard (English) and the new GEM relays. All of these relays will give reliable service when the maximum current is in the range of from 1.5 to 2.5 ma. Adjustment of the relay may be more critical because of contact arms which must be bent to obtain the proper gap. Where currents of more than 2.5 ma are available, adjustment of the latter mentioned relays is less critical and "borderline" operation is usually eliminated. From our own experience and from information received from RC builders around the country, the Sigma 4F and 26F are tops for the low power level, as well as higher power, applications. The Sigma 11F and the Gem relay are the most popular as far as auxiliary relays are concerned.

As fine a relay as the Sigma 4F relay is, we would not favor it over the GEM or Sigma 11F for auxiliary use (reed banks, relays used in conjunction with other more sensitive relays, etc.). While we will go into relay operation in more detail later on, Frank Hoover of CG Electronics informs that a 100 Ohm ½W resistor placed across the escapement coil or motor terminals will prevent burning of the relay contacts.

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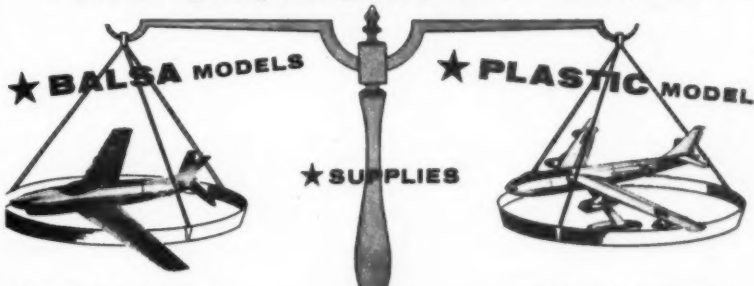

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Before leaving the subject of relays for this month, we'd like to remind you to take precautionary measures with your relay contacts in order to insure reliable operation. Dust, dirt, grime, fuel fumes, oil, etc. can prevent relay ccontacts from performing their operation reliably. The ideal situation is to use an enclosed relay.

Lafayette Radio offers quite a few plastic boxes which can be used for enclosing relays, receivers, etc. Reliability in RC work comes in paying attention to the small details. Before enclosing your relay or receiver, remove all dust or grime, clean the relay contacts with carbon-tet and, to top off the job on the receiver, spray the unit with clear Krylon or General Cement Printe-cote (available at radio supply houses).

We were going to present some new circuitry this month, but after a quick look at various pieces of test equipment some of the RC builders use, it was decided to see what could be done about putting a little reliability into meter readings. We've found that many cases of mal-operation, especially in receivers, could be traced to the milliammeter's not indicating the true current. Some of the inexpensive meters were off as much as 10 per cent and a few were off almost 20 per cent. Needless to say, proper operation of your receiver or transmitter cannot result from a situation like this. Fig. 1 shows how to calibrate your meter for greater accuracy. "A" shows what is perhaps the easiest method to work with, although the circuit in "B" will give good results if the voltage and resistance are accurately known. A local radio or TV service shop should be able to help you calibrate your meter for greater accuracy. Fig. 2 shows the set-up for calibrating a voltmeter. It must be remembered that the accuracy of calibration will only be as good as the accuracy of the standard meters.

Fig. 3 shows some of the possibilities obtained when using a new six-arm escapement. The New model 6P12 should be ideal for engine control or trim work. One of the features of these escapements is that they are guaranteed for life, all parts being hardened and factory adjusted. Any malfunctioning through wear, etc., will be corrected by New Products Co., Box 643, Union, N.Y., free of charge.

NEW ITEMS

Last month we reported on the German Standard MK-2 receiver, available through the Wilshire Model Center, 1326 Wilshire Blvd., Santa Monica, Calif. Since we had just received it, we could not give any details on its performance. However, about one month of testing has shown it to be a very unusual receiver. The set utilizes a sub-miniature tuning eye which gives an indication of resonance without the use of a meter. Operation was perfect at all ranges and the tuning eye followed the test meter precisely. The relay current with no signal coming in was zero, rising to 6 ma upon receipt ot a signal, using 45 volts on the plate. The fantastic thing about this set was its ability to operate, reliably, with the B-voltage as low as 18, *including* the operation of the tuning eye. Needless to say, we're quite impressed with this unit.

If you're looking for an auxiliary receiver, or something you can afford to put into a permanent installation in each boat or plane, you might investigate a hard-tube receiver, complete with relay, measuring 1¾ x 1-15/16 x 3 in. and weighing about 3 oz., obtainable from Lafayette Radio, 100 Sixth Ave., New York City, for $7.95. This unit checked out very well on the ground at ranges up to 500 ft. The relay is completely adjustable and the receiver will operate on from 45 to 67½ volts. Lafayette also has the small earphone, model MS-111, used in the audio check unit described under Technical Topics. The price is $1.49.

While not a new item in this country yet, it is erported that German receivers may soon be on the market utilizing transistors and employing no tubes. One unit is said to be a completely transistorized six-channel unit and the other is a transistorized receiver which will operate an actuator directly, thus eliminating the relay.

Since reed receivers are enjoying a high degree of success, you might be interested in the CG AR-5 unit. This five-channel reed relay weighs but ¾ oz. and, since mentioning it last month, we've given it a thorough check-out in a boat. Can't beat it for performance and size. Also from CG Electronics comes news of their new five-channel reed transmitter, available for operation on either 27.255 mc or in the 50-54 mc band. This T-5 transmitter is very stable and the audio will vary less than ½ per cent over a temperature range of from 0°F to 150°F with a B battery voltage between 100 and 150, or filament voltage of from 1 to 1.5. This amounts to a spread of two cycles or less and is well within the band width of their reed units. The new transmitters have anodized aluminum cases and holders for the batteries. Price for the 27 mc version is $89.50 and for the 50-54 mc job the price is $92.50. These hand-held transmitters have a stick type-control. There are 50 mc crystals available for $5.95 for those who want to follow the conversion instructions given

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in Technical Topics.

ESSCO, 58 Walker St., New York City, has made available to the RC fan, for the first time, a small lightweight and sensitive DPDT relay. This GEM relay sells for $5.45 for the 5,000 Ohm model and $5.95 for the 7,500 Ohm model. A DPDT relay offers many advantages for "Mickey Mouse" or cascaded control systems. Don't overlook the possibilities of using such relays. If you're looking for a battery charger, for no matter what type of RC battery, investigate the ESSCO line.

Looking for another boat in which to try out a new RC rig? Something that has a different look and which you can put together in a minimum of time? The Ideal Zephyr, a 20 in. model of a 14 ft. Chris-Craft outboard, has a pre-fab hull which is ready to accept the plywood keel, ribs and top deck. Plenty of room for RC gear and plenty rugged for throwing in the back of the car in case of bad flying weather. Available at most hobby dealers.

Clevite Transistor Products, 241 Crescent St., Waltham 54, Mass., announces a line of power transistors. There units provide greater power handling characteristics at a lower input voltage. Designed for Army-Navy use, they are being used commercially in auto radios and portable radios. Might be just the thing to operate an actuator directly, thus eliminating the relay.

Polk's Model Craft Hobbies, 314 Fifth Ave., New York City, may have just the power plant for that RC boat you plan to put together over the week-end. If it is an inboard type, you'll be interested in the Aristo-Craft Motor Power Assembly, model B or C. Selling for $1.75 and $2 respectively, these units provide a motor mounted at the correct angle, a spring-loaded battery box, switch, flexible coupling, mounting screws and a small working light for the deck. Needless to say, these units will cut installation time to a minimum and, after all, what plane flier wants to spend any more time than he has to on a boat? If it's an outboard type you need, you can get various sizes from $2.50 up to the deluxe Evinrude scale job for $4.95. Incidentally, it is best to turn the motor itself, just as in the real thing, when you attach your RC turn actuator. For your latest plane or RC car, Polk's also carries the famous English M-S airwheels, available in sizes from 2 in. to 4 in. at prices from $2.95 to $4.95, comparable with the old M & M airwheel of postwar days.

If you're looking for a four-position escapement for engine speed control, one which is rugged and well built, contact the Wilshire Model Center, 1326 Wilshire Blvd., Santa Monica, Calif., regarding their model 1394-1. This precision German-made unit operates on from 2 to 6V and the 40 Ohm coil insures low current draim. The weight is but 1.1 oz. The Wilshire Model Center will probably be handling quite a bit of the sensational new German motors and RC gear. The Germans have been quite a while getting into the commercial RC market but we think they have some mighty unique equipment.

Old Faithful

(*Continued from page* 17)

more lively airplane although it still should not be too difficult to handle. In fact, it will take a lot of different engines in the group between .15 and .19.

Building should be straightforward, although you should take care that the distance between engine bearers suits your engine. Also, you will need the added strength gained from reinforcement with silk or nylon at the points indicated on the drawing.

Proportional Dividers . . .

(*Continued from page* 25)

of the tools we need can easily be made by even the most inexperienced model builder. The proportional divider described here saves many hours of work. This divider takes into acccount the most popular scales found in magazines and books.

Construction—whether of wood, metal or plastic—should take no more than an hour and a half or two. Proportional dividers of this size could not be bought for less than a five dollar bill, yet you can make this pair for a few pennies. Follow the sketches for construction and assembly.

Using a proportional divider is a simple matter. Just set it on the scale you desire to use—let's say a three-view in the magazine to be twice the size shown. Have the pivot point set on the two-time scale. Then mark off the dimensions on the three-view with the small needle width and transfer them to your drawing paper with the large needle width which, no matter where the divider is set, will always be twice the small needle width.

Plans can also be reduced in size by reversing the procedure. Simply use the large needle width to take the dimensions from the drawing to be reduced and then transfer them to your drawing paper with the small needle width. Thus, if we had it set for the two-time scale, reversing the procedure would produce a one-half scale drawing, and so on.

Once you get into the habit of using proportional dividers, it will become second nature and you will wonder how you ever got along without them.

Contact Cement

(*Continued from page* 15)

cement film, very definite limitations are imposed by the strength of the materials being joined and by the effective period of the contact bonding feature. Being of about two hours' useful duration, from time of coating, this feature eventually is lost.

Over-drying before contact results in a weak bond that must be parted with thinner and re-made. Shoemakers pre-dry to the limit of good bonding action—a matter of experience—and then hammer the joint together. Model materials, not standing such heavy-handed treatment, must be joined as soon as the coatings are really dry, but still soft enough to be bonded by finger pressure alone. In favorable weather this will be from 5 to 12 minutes after application. Temperature affects cohesion and drying, so try to work where it is at least 70°F.

While very convenient in that it eliminates the need for pins and clamps, the contact-bonding feature is vital for a more basic reason. It is proof that the joint is made. If a joint is strong when first bonded, it will never become weak in normal service. But if it is poorly bonded at the start, it will never be very strong. After bonding, the cement film continues to dry and become stronger, attaining almost full strength in 24 hours. New joints, if of rather small area, may seem unduly springy. If not up to required strength after this time, their area is inadequate for a contact cement.

There are a number of closed joints in which contact cements excel over the regular types: fuselage nose-doublers for both box and profile construction; laminated parts, such as wheels, bulkheads, formers, nose-blocks, sheet tail-surfaces, tip-ribs and spar splices; wing leading edge or other frame-supported sheeting

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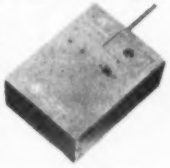

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and all sheet-type construction; edge-joining of narrow sheets to make greater widths, rib cap-strips cut to fit "on the spot" from pre-coated 3 ft. lengths. Landing gears and various fittings of sheet metal or wire may be "sandwiched" into laminated sub-assemblies.

Curved-bonded laminations are easy with a little preparation and practice. When ready to contact the plies, hold the first to the desired curve and bond the others to it. The use of sticks or heavy wrapping paper as separators will prevent unintentional contacting.

The problem of proper alinement before contact is made is easily solved by having only the master part made to finished outline. The other part, or parts, should be left large and trimmed to the master after bonding.

Cloth control-surface hinges, so favored for their simplicity, are often criticized for dope-stiffness and for ultimate cracking. Contact cements eliminate these faults by permanently rubberizing the cloth. Prepare the hinges by cutting a bit oversize and dipping them into the cement. Be sure of a heavy even coat and pin to a shelf edge to dry. At once, apply a heavy coat to the hinge area of the surface. When the hinges and the cemented areas are dry, trim the hinges to size and apply them like adhesive tape. Exert tension while contacting to prevent the occurrance of any slack. Not fraying, the treated cloth may be cut on the bias. When so cut, all threads cross the hinge line giving twice the strength of a straight-cut hinge.

A novel use for contact cements is as a finish primer of metals or other non-porous surfaces. A very thin, well dried coat prevents peeling. Roughen the surface with sandpaper and wash it with lacquer thinner. Thin the cement with lacquer thinner until it is too thin for any pulling tendency to develop during application.

An unpleasant aspect of test-reporting is that, quite often, a promising product may be found wanting in an especially significant respect. With contact-bond cements, this "want" is where it really hurts. The cements themselves are immune to alcohol and are highly oil resistant. A new joint can be immersed in hot fuel with no immediate bad effect. But neither will these cements bond to an oily surface, nor remain bonded to a clean surface which becomes oil-contaminated through seepage. Despite precautions, a structure is apt to absorb oil eventually. Washing a model with mineral solvents (gasoline, naptha, etc.) only hastens the process by diluting the oil and carrying it into the least opening. Still worse, these solvents themselves attack the cement bond. The only recourse is to disregard the alcohol immunity and fuelproof the model in the customary manner.

It is advisable to remove all cement from outer surfaces, where seams are exposed, with a rag slightly moistened with lacquer thinner. This is to prevent heavy deposits of cement, usually present at such points, from bleeding into and discoloring the model's finish. Work sparingly with the thinner to avoid opening the seam and follow with a sealing coat or two of clear dope.

A neater-than-usual installation of cabin windows is possible with contact cements. Roughen the frame and material overlap and coat the material carefully. After contacting, any excess cement around the window may be rolled off with a finger. Just one word of warning: Weldwood contact cement is active on doped surfaces. As there may also be others that are similarly active, test this effect before using.

The solvents of most contact cements are effective on plastics. The solvents themselves may be used as plastic cements, or the contact cement may be employed.

In the way of tools, sanding aids can be made by cementing sandpaper to sticks of various lengths and contours. Also, pieces of razor blades can be bonded between balsa strips to make special-purpose cutters.

Working well on so many materials, it is wiser to advise a trial of these cements than to attempt a complete list of uses. While I was taking some of the accompanying photographs, one of my youngsters broke a neighbor's window. Out of urgency, I patched the 4 in. hole with a disc of glass and contact cement. Upon fitting a new glass later on, the broken one come out intact. Although broken sunray fashion, each of the seven sections was firmly bonded to the disc.

Should contact-bond cements be desired for slip-together joints, where the contact feature presents a problem, just coat and dry in the usual way. Then apply a second coat and fit the joint while wet. Clamp, if necessary, and allow to dry overnight at least. Voids in such joints may be filled with wet cement eased in by brush.

Contact cements cannot replace regular model cements, for the two are of mutual value, each making up for deficiencies of the other. By having both to use, we can enjoy a far greater freedom of constructive technique than ever before. Future designing is sure to reflect this freedom.

The MAN .19

(*Continued from page* 36)

acutal running time required by an engine before becoming ready for maximum output hinges upon the quality and accuracy of manufacture and the soundness of its thermal edsign. Every engine is different and, whereas a top quality, carefully checked racing engine may be ready after an hour of short high speed runs, a job like the home-built MAN .19 may take several hours, depending on the workmanship.

The purpose of this article is to suggest a break-in program for the MAN .19, but the foregoing explains why this cannot be done in specific terms, since the surface finishes in your particular example are known only to yourself. However a 10 x 4 Top Flite or equivalent is a good prop for the purpose and, if your piston and cylinder are free enough to bounce off compression after five minutes' running, another two to three hours should be quite adequate. Do not be unduly worried if the piston bubbles slightly at first, as this will disappear with running if it is not obviously excessive. That is a virtue of the cast iron piston. Its pores absorb carbon.

Glow Head Conversion

Since you have made the basic engine, it should not be necessary to describe step-by-step machining operations for this unit as the drawings are self-explanatory. However, the aluminum plug which replaces the contrapiston should be carefully finished to a snug push fit in the cylinder bore and, when fitting, a half dozen .005 cooper gaskets should be interposed between the cylinder rim and the lip of the plug so that compression adjustments can be made by trial and error on the test bench. An OK long reach plug, which has a medium heat range, is very suitable.

Reed Valve Backplate and Carburetor

Again the drawings are self-explanatory, but there are a number of things to watch. It is important when drilling the four passages through the valve face to insure that the drill is entering at the correct angle that the holes may converge and meet at the right place. Should the angle

be incorrect, but the external machining executed to drawing, there is danger of breaking through the wall in one direction, or reducing the center screw seating in the other.

With this type of valve it is vital to smooth running at slow speeds, and ease of starting, to have an absolutely smooth flat surface on the valve face, so that minimum pressure is required to make the reed seal against the face. A piece of plate glass and metal polish will make an excellent lap for obtaining this surface.

Perhaps the most difficult part of the whole engine to make is the reed itself. The number of petals has been restricted to four, despite the fact that there is room for more, because it would be exceedingly difficult to cut a more complex shape with a pair of scissors. That is how it is done: with a very sharp pair of stiff scissors which will produce the least amount of burr. Great care must be taken when cutting to see that the metal is not permanently bent in the slightest degree, as the slight stretch produced in the metal will positively prevent a pressure-tight seal. It will be found that scissors produce a burr in one direction only, and if the scissors are not turned over during the cutting operation, the burr will remain only on one side of the component. The other side will be the seating face and this may also be lapped lightly to remove any faint irregularities. However, not very much can be done by lapping anything so flimsy and, if the flaws are bad enough to be visible, it is advisable to cut out another part.

The reed retainer plate is contoured in such a manner that it has a flat surface ¼ in. in diameter, which actually clamps the reed in position. From this flat outward a radius develops which should conform to the natural flexure of the reed when it is in operation. If a paper template is made to the dimensions given, it will serve as a useful guide during machining. The important thing is that there should be no actual corner on its surface which would tend to make the reed bend more acutely than elsewhere. The radius must therefore blend smoothly into the flat.

When assembling the unit, take care to aline the reed accurately with the ports and make sure that it does not move when tightening the center screw. Since any rubbing of the conrod on the retaining plate tends to unscrew this center screw, it is advisable to fit a locknut on its end inside the intake tube.

Finally, on the subject of intake diameters, larger bores may be used with success in conjunction with reed valves than with other types, and the 5/16 in. bore specified will be found to give sufficient suction for general use. A reduction to disappear with running, if it is not obvi- bore and, when fitting, a half-dozen .005 7/32 in. diameter will give a very high fuel lift and make the needle control more sensitive, but will detract from performance. A good plan is to start small and increase the size as required; however, the drawing size will keep most people happy. A short intake, incidentally, is an advantage with this type of valve, and a long one does not improve fuel flow as with normal valves having fixed timing.

To those hardy souls who attempt this project, let us thank you for your interest and hope that you get as much satisfaction out of making and using the engine as your patience deserves. We would be greatful for a couple of lines on your findings and also as to whether you like this kind of article in MAN. How about a gas turbine next? END

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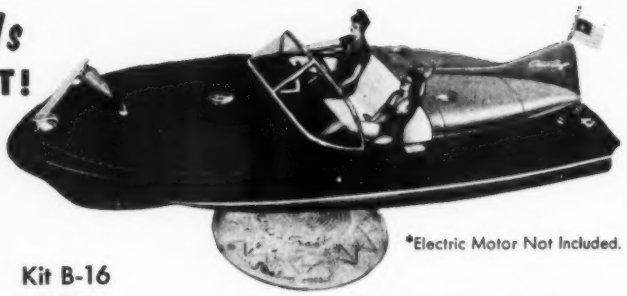

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Tanks for Aerobatics

(*Continued from page* 22)

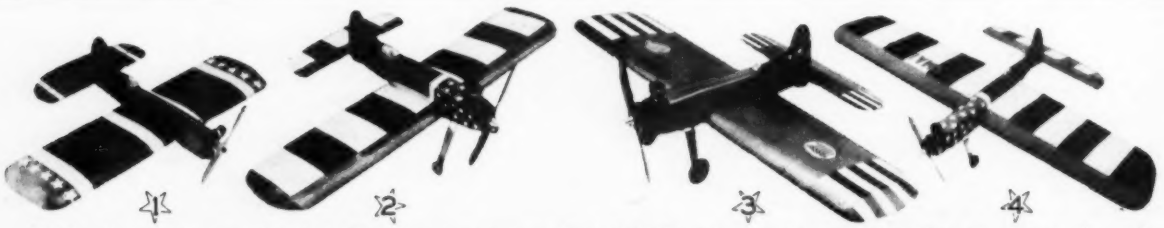
line. Compact layout dictates attachment of one feed line to the main tank vent outlet. The system has been well tested and the steel ball check valves perform well despite engine vibration.

A feeder system which does not use check valves is also shown. This was developed by Ed Mahoney and Dick Bush of Van Nuys, Calif. As shown, the feed lines begin at the rear of the main tank and each feed line is teed into by the opposite vent line. Ed and Dick have custom-built several of these tanks for various modelers and the tanks perform very well.

In addition to tanks, they have developed many new RC items from new airplane designs to special gadgets and they have had much success with their special carburetor-venturi assemblies which they build to fit each type of engine. About 25 are in use in the Los Angeles area with such good results that Ed is considering commercial production eventually. In the meantime, modelers can have such special equipment custom built by writing to Ed Mahoney, Caboose Hobby Shop, 8316 Woodman Ave., Van Nuys, Calif.

A clank tank and the deBolt swivel tank as illustrated are about the simplest way to provide fuel for inverted flight. The usual method is to run the clank or the swivel (in deBolt's tank) cross-wise to the line of flight so the engine won't starve out in a dive. However, a new type of clank tank has suddenly appeared out West. This is made from a baby food can and the clank runs parallel to the line of flight. Three new Live Wire Cruisers have appeared with this set-up and the tank simply strapped externally on the cowl right behind the engine. They perform well and are able to make steep dives without killing the engine because of careful layout of the clank. One of these was built by Chuck Boyer. All have cascade escapement control systems.

Another tank kink shown in the sketch is to solder internal baffles inside to cure surge problems. Robert Forbes of Berkeley, Calif., used the baffle shown in his very small, light wingloading plane with a Thermal Hopper engine. This ship was so highly maneuverable that the engine



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would sometimes cut out. Forbes solved the problem by soldering in the baffle. It is difficult to relate this solution to theory because, in a rudder-only ship, the G-loads will always tend to "plaster" the fuel on the bottom of the tank, whether the ship is in a loop or any other maneuver. However, it's often proved that RC is 90 per cent good practice and 10 per cent theory. On larger tanks some modelers solder in a similar baffle running lengthwise down the center of the tank to prevent surge troubles.

The tanks illustrated in this article show once more that when it comes to developing something unique to solve a special problem, nobody can beat the RC modeler at finding an ingenious solution. And with such unique ideas developing constantly in all phases of radio control, there's no telling what amazing things we'll have 10 years from today.

Swifty

(*Continued from page 26*)

down. The wing tip of the other wing-half is raised 3 in. off the table, with another book holding it in that position. After the cement has hardened, remove the wing from the table and check it to see that the spars line up. The wing should not twist toward the tip; if it does, the model won't fly. If necessary, pinch the middle joints for more or less dihedral and recement.

The wing and the tail are covered with light tissue and they are not to be doped or painted, to avoid warping the wing out of shape. Nail polish is handy for cementing the paper to the wood (just at the edges of the paper), as the containers have small brushes. Paper has a tendency to shrink when warmed and to loosen up when cooled. Therefore, the model should be covered in a place that is of about the same temperature or warmer than the place where the model will be flown. This precaution is taken to minimize the warping of surfaces. Breathing on a warped wing surface often straightens it out.

The balsa motor stick is tapered (do this with a sanding block) and lightly sanded all over. The thrust bearing and rear rubber hook are wrapped in place with thread and then cemented. The metal fittings will be a problem. They may be made to straight pins, if nothing better is available. The thrust bearing is a little strip of metal bent like an L, with a hole drilled or punched through with a phonograph needle. Some builders take a fine nail, hammer it a bit flat and punch a hole through with another nail. Your hobby shop may carry a small size thrust bearing. If you can't find such parts, tell the editor of MODEL AIRPLANE NEWS about it and he will help you. The plastic, rubber-powered propeller, I believe, may be carried by all hobby shops and be sure to mention the words "rubber-powered"; otherwise, you will get a gas engine type that is no good for this purpose.

Make the wing mounts out of some scrap balsa and cement them in place underneath the fuselage. After the cement has hardened, cement the wing between them and then add the tail assembly to the motor stick.

Put on the propeller and rubber motor. Gently glide the model and observe its flight. If it dives, add a bit of modeling clay underneath the rubber until a smooth glide is obtained. If the model noses up and down violently, add clay to the nose until the glide is smooth. Now you may wind it up and let it fly. The model can be flown outdoors in calm weather.

If the model glides well, but noses up and stalls when the rubber is wound up, bend the prop hanger very slightly until

(*Continued on page 46*)

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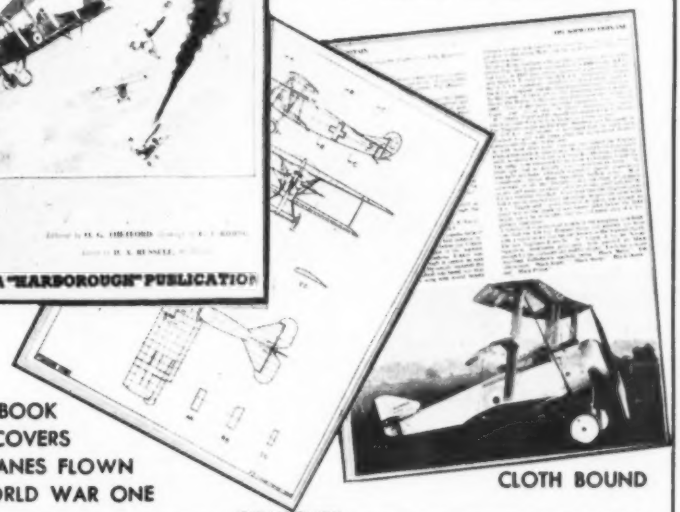

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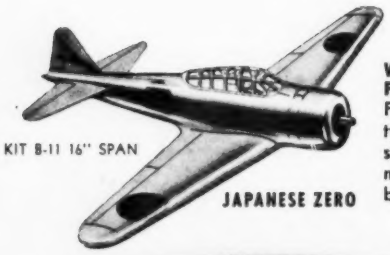

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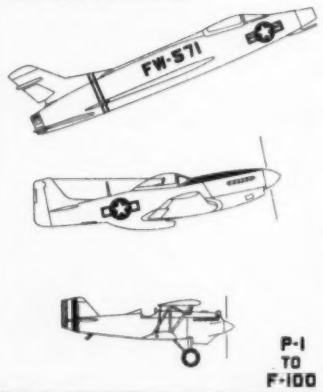

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Contest Calendar

(*Continued from page 35*)

nets Model Plane Contest for CLS, CLC, RC, FFG. W.E. Klosterman, CD., R. R. 6, Celina, O.

1 *Cleveland O.:* Class AA 2nd Annual Radio Control Meet. John W. Grega, C.D., 355 Grand Blvd., Bedford, O.

1 *Syracuse, N.Y.:* Pending

1 *Dallas, Tex.:* Class AA Cliff Model Club 2nd Quarterly Contest. Joel B. Hargis, C.D., 1102 W. Saner Ave., Dallas, Tex. Pending.

7- 8 *Buffalo, N.Y.:* RC Shindig. Pending.

8 *Washington, D.C.:* National Capital Model Air Show. Bob Kirwan, C.D., 4305 16th St. S., Apt. 2, Arlington 4, Va. Pending.

8 *Spartanburg, S.C.:* Class AAA 8th All-Dixie Championships for CL, TLG, OHLG, FFG, CLS, CLFS, CLC, RC. Robert S. Gaddis, C.D., 114 Wrightson Ave., Spartanburg, S.C.

8 *Pittsfield, Mass.:* Class AA 5th Annual Berkshire Model Plane Meet for CLS, CLC, TR, beauty. Robert L. Elliott C.D., P.O. Box 278, Pittsfield, Mass.

8 *Omaha, Neb.:* Class AA Omaha Aeroneers' Model Airplane Contest for FFG, TLG, CLS, CLC. Jerry Bahula, C.D., 6933 Pinkney St., Omaha 4, Neb.

8 *Cincinnati, O.:* Radio Control Contest. For info: Gerhard A. Vogeler, 2873 Carroll Dr., Cincinnati 11, O. Pending.

8 *Mankato, Minn.:* Class AAA Mankato Exchange-Mankato Modeleers' Model Meet for FFG, FFFS, TLG, CL, CLFS, CLS, CLC, RC. William B. Thomas C.D., Box 713, Lake Crystal, Minn.

8 *Farmington, N.Y.:* Class AA 3rd Annual Long Island Industrial Championships for CL, CLS, beauty, CLC, NC. Arthur F. Wardell, C.D., 2 Hunt Place, Bethpage, N.Y.

14-15 *Spartanburg, S.C.:* Sky Knights' Record Trials for all free flight and controlline classes. Robert S. Gaddis, C.D., 138 Morgan Sq., Spartanburg, S.C.

15 *Evansville, Ind.:* Class AA 10th Annual Model Flying Circus for CLFS, CLS, CLC, CL, non-flying scale. Herman W. Berning, C.D., 2012 Conlin Avenue, Evansville, Ind.

15 *Hartford, Conn.:* Class AA Greater Hartford Model Plane Meet for CL, CLS, CLFS, CLC. Eugene P. Karambay, C.D., 30 Parker St., Newington, Conn.

15 *Waukesha, Wis.:* Class AA 3rd Annual Lakeland Radio Control Contest. William J. Deffner, C.D., 234 Greenfield Ct., Waukesha, Wis.

15 *Orangeburg, S.C.:* Class AAA 2nd Palmetto Regional Championships for CL, TLG, OHLG, CLS, CLC, CLFS, RC, FFG. Lary Bly, C.D., P. O. Box 744, Orangeburg, S.C.

15 *Watertown, N.Y.:* Class AA Meet for FFG, TLG, OR, OHLG, flying scale. Amos H. Harvey, C.D., RD 2, Marcy, N.Y.

15 *Camden, N.J.:* Class AA Highway Glo-Bugs' 3rd Annual Team Race Meet for TR, CLC, destruction

(*Continued on page 55*)

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MAN at Work

(*Continued from page 6*)

Dewey goes on, "as it would do away with the thermal flight and eliminate the people who win on a big puff of hot air.

"Unless the 'heavies' among the free-flight builders find some way to eliminate thermals, these sometimes elusive currents of air will still determine the winners of free flight endurance contests. Take two heavy planes," the man suggests, "that don't climb fast or glide so long. Assuming that both are equally well built and designed, the one that flies around in a rising current of air will still get the high time, even though there is no long, soaring flight. I do not see how you can legislate a thermal.

"Several weeks ago, I saw my Past Due soar in a thermal for 15 minutes with the dethermalizer at a 45-degree angle, and wondered how heavy you would have to make a ship, or how badly adjust it, so that no thermal would affect it. A barn door would have made six minutes in a thermal like that!

"Of course," Dewey Beach winds up, "we might get rid of the themal influence by flying at midnight in a howling blizzard!" He does say further that rules sometimes must change but let's have a long notice period and restrict changes to not more than two events at a time.

* * *

Speaking of blizzards, consider the Fourth Annual Polar Bear Meet, South Jersey (who sponsors this, the Highway Glow Bugs?), held last March in perfect weather—for polar bears. When the Connecticut contingent left home there was nine inches of snow. Flying took place in a blizzard. Perth Amboy and New York City boys, not going for this country stuff, came prepared for anything—stoves, shelters, blow torches for warming up engines. Team race pilots had a tough time seeing their own models in the swirling snow, much less the opponents'. First instrument flight team race on record—maybe the last. Seventy combat entrants chopped away at each other through snow and ice. Braving the storm were 210 entrants. Scale winner was a four-motored B-29. Though rumored to be radar- and GCA-equipped, this ship was not required to fly, which upset the ever-present ghouls no end. Scale can be so friendly! To take the Fifth Annual Polar Bear Meet, we are betting on Admiral Byrd. Cool, man, cool!

* * *

Lakewood Flite Masters, 15118 Detroit Avenue, Lakewood, Ohio, have a six-page newsletter, the "Flitemaster," and all clubs are welcome to copies, especially District Three outfits. . . . Fighter Planes, P-1 to F-100, with about 50-odd three-views of AF fighters, including some that are collector's items, is a must for fans. Published by Edward J. Farley, 5480 Allamanda Drive, Jacksonville, Fla. . . . Tick off Timer, Tatone Products, 1275 Geneva Avenue, San Francisco, is a good item for contest free flighters who are sick of overruns. Not just good. Excellent. Another item is the Darwing, a stunt flying wing.

Gil Henry excited about new endurance mark just set in Barberton, Ohio. Wires that a seven-pound deBolt job with Veco .35, flown by Duene Sander and Robert Bell, flew 24 hours and 15 minutes. That's practically the equivalent of 300 normal ukie flights. Next?

* * *

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(*Continued on page 55*)

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Swifty

(*Continued from page 43*)

the prop pulls a little bit downhill. This is called "downthrust."

Experiment by bending or twisting one wing tip so that its front edge is raised slightly. This will cause the model to circle. Breathing on the paper will hold the wing in a twisted position. A slight twist is quite effective; don't overdo it.

Bill of Materials

Two pieces— 1/16 x 1/16 x 36 hard balsa (or 1/16 x ⅛ soft); *one piece*—3/32 or ⅛ x ¼ balsa, 12 in. long; 18 in. of ⅛ rubber; *one* small thrust bearing; *one* 5-in. Kaysun rubber-powered plastic prop.

The Humdinger

(*Continued from page 20*)

down on the building board, add the half-formers for the port (left) side of the model, insuring that these are true and square with the top and bottom longerons in the plan view. The forward and aft portions of the ⅛ in. sq. side longerons should be cemented to the fuselage side rib *before* fitting to the half-fuselage assembled on the building board. When the half-fuselage is completely dry, remove from board and add half-formers for starboard side, followed by other side rib and longeron. The ⅛ x 1/16 in. flat side braces can now be fitted between F-3 and the TE of the built-in fin. The bottom of the cockpit window has a ⅛ in. sq. diagonal. Fill in the four sides of the fuselage between F-1b and F-2 with 1/32 in. sheet. Cement across the fuselage between the two side longerons the ¾ x ⅛ in. strip to which is bound and cemented the 1/16 in. brass tube for the landing gear.

The stiff paper tubes can either be purchased commercially or rolled around a 3/16 in. dia. rod or tube and the seam cemented. When dry, these should be fitted in their respective places for the landing gear rubber which passes across the fuselage and for the wing-joint dowels. Sheet lower portion of fuselage between F-2 and F-3. It is essential that these tubes be set parallel to each other in plan and front view. This can be checked by pushing a length of dowel through the tubes so that the dowel extends the same distance each side of the fuselage when the model is viewed from the front and from above.

The stabilizer platform and celluloid cockpit cover may now be added. If desired, a fuel tank can be built in to the space between F-1 and F-2, prior to sheeting in the first section of the fuselage. Similarly, the engine bolt heads can be anchored to the rear face of F-1b, if desired, to obviate the necessity for fitting access holes in the nose for attaching the engine. The fuselage structure is completed by the addition of the 1/32 in. wire skid in the underfin.

Wings are quite simple and straightforward, with the possible exception of the 3/16 in. inside diameter paper tubes, which require a certain amount of care when fitting to insure the same incidence and dihedral on each half-wing. Note that the inboard rib No. 1 is tilted at 8° to give the correct dihedral of 1-5/16 in. at the wing tip. The writer recommends that the wings be constructed by pinning down over the full-size plan the shaped and slotted TE. Follow this by pinning the ribs in their appropriate positions, then cement the ⅛ in. sq. hard LE into place. Allow to dry, then slide the tapered ⅛ in. thick spar into position and cement all joints. The tip is carved from solid balsa block.

The stabilizer is cut from ⅛ in. medium sheet. Three-inch wide sheet can be utilized if necessary by butt-joining (parallel with TE) the forward portion of the

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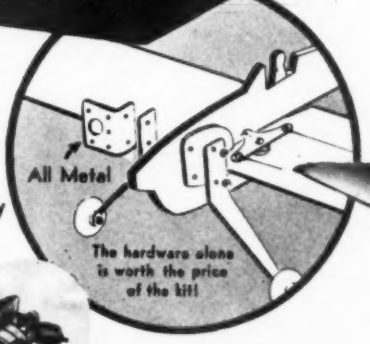

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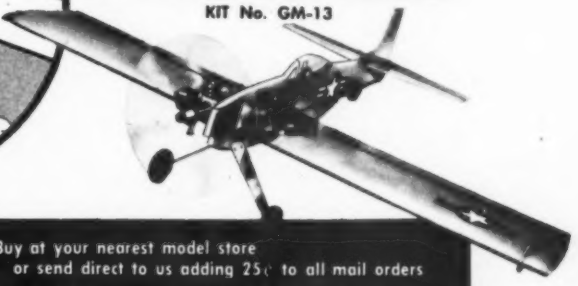

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stabilizer. Sand to the section shown in the side view.

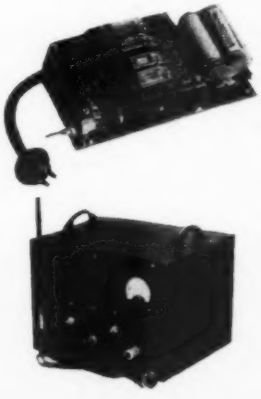
The landing gear is made in two pieces and both legs are separate. After bending to the shapes indicated on the drawing, the two items of each leg should be bound and soldered together and the space between filled in with 1/16 in. sheet balsa. Finally, cover each leg with two layers of tissue and give two or three coats of clear dope to strengthen. The forward end of each leg (1/16 in. dia.) fits into the 1/16 in. brass tube and the shock rubber attaches to the 1/32 in. diameter wire and passes through the paper tube in the fuselage to the other leg.

After the entire model has been covered and doped (including the sheet stabilizer), fit the engine, landing gear and wings. Note that the engine should, initially, have approximately 2° downthrust and ½° right thrust. Next, cement the stabilizer to the top of the fin. To assist alinement, pins may be pushed through the stabilizer into the platform to hold stabilizer in its correct location until the cement hardens. Carry ont a thorough check to insure that wings are free from warps and have the same incidence and dihedral on each side; also, that stabilizer is square to fin when viewed from front or rear.

The assembled model should be balanced to find its CG. If the model balances within ⅛ in. either forward or aft of the position shown on the drawing, no ballast should be necessary for initial test flights. If CG is *more* than ⅛ in. from the point on the plan, add clay to nose or tail as required. It should be pointed out that the CG position is not really as critical as the above figures suggest, as the designer's ship has flown successfully with the CG more than ¼ in. farther forward than the point indicated on the plan, It is, however, recommended that the limits of ⅛ in. be observed to simplify test procedure.

As will be expected, the Humdinger glides fairly fast, so test-glide over grass if at all possible. Trim glide bv warping TE of stabilizer slightly up or down, as required. When satisfied with the glide trim, you are all set for the first power flight, for which fairly calm conditions are best.

Sufficient fuel for about 10 seconds' engine run is all that is required during power trimming. With the engine throttled right back so that the ship will only have enough revs for level flight or a powered



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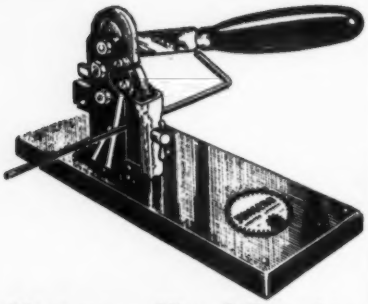

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glide, run forward and launch smoothly into wind, if any. A straight powered glide of about 100 ft. should be the result. If the ship tends to turn left or right, check that all flying surfaces are entirely free from warps. If nothing can be found which would cause a turn, adjust side thrust slightly to counter turn. When flying on about half revs, the ship should climb in gentle left-hand circles, with its own natural turn to left or right on the glide. Excessive turn on the glide can be corrected by fitting a trim tab to the rear of the fin or by carefully warping up the TE very slightly on one side of the stabilizer. In either method adjustments should be carried out a little at a time until the correct trim has been acquired.

Foreign Notes

(*Continued from page 33*)

import duty), Thai model enthusiasts look forward to bigger and better modeling in the future. Having no national model club at the present time, modelers in Thai capital, Bangkok, have found a happy substitute for week-end contest-going. A group of 30 or 40 modelers get together, hire a big bus, stack model gear on top and head 60 or 70 miles out of the city. Demonstration flights are given during the day which draw quite a few spectators and campfire games are held at night. Correspondent C. Kamonsiri thanks MAN for keeping up interest by encouraging new ideas and model improvements. "MAN is our best friend," he says. Who could wish for a nicer compliment?

Poland

As yet, RC is still something of a rarity on the other side of the Iron Curtain and particularly so in Poland. Recently, however, we received some details of a combined RC project by three Warsaw modelers. Spanning 74 in. and powered by a 3¾ cc Diesel turning an 8 x 6 four-blade prop, the model is a cabin pusher with tricycle gear and twin fins. Rudder and elevator control are fitted and the all-up weight is approximately 4¾ lb. An unusual feature is the large tankage of nearly a half pint.

Yugoslavia

Top Yugoslav modeler Emil Fresl, internationally known contest flier, leading European exponent of the Torp .15 in speed and free flight and co-builder of the Yugoslav Oskar Diesel motors, placed second in the annual Yugoslav parachute jumping contest.

Engine Review—Veco. 19

(*Continued from page 2*)

project above the crankcase and fit into an annular recess in the head with a gasket at the joint. The result is that the gasket is trapped and cannot blow out.

The combustion chamber shape cast into the head is substantially flat with a straight groove to clear the piston baffle and a long reach plug tapping which is offset toward the exhaust side. Six screws retain the head and four the rear cover, also recommended in the instruction leaflet for radial mounting.

The needle valve assembly and, in particular, the control knob, are built for practical service, having harpoon-type pressure rings for the tube connection, a strong spraybar which you can tighten up without fear of breakage and a control knob of large diameter with a finely serated ratchet device.

Handling and performance

Running the Veco is an uneventful business because it is a model of behavior with absolutely no vices. It looks as if it will go—and it does go—with very creditable results. The needle valve does exactly

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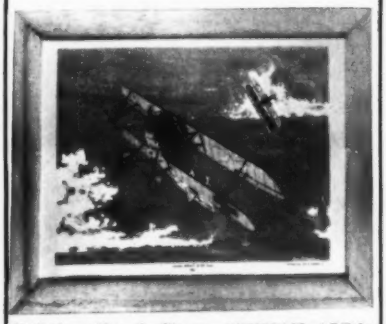
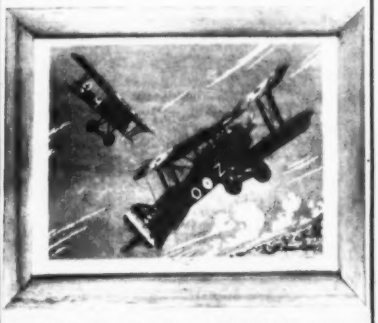
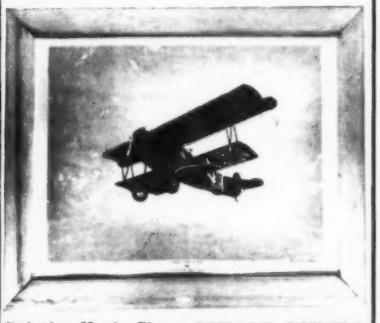
World War 1 Aircraft In Full Color



Painting No. 1—Shows **GERMAN ALBATROS** being attacked by British Sopwith Pup. All in full battle color, grey, red, brown, etc. against blue, white fleeced sky. All strut and rigging wires shown in full detail. Beautiful for your Living Room or Den. LARGE size 17" x 14" with white border ..... $3.98 ☐



Painting No. 2—Shows **BRITISH S.E. 5** of No. 85 Royal Air Force Squadron being attacked by German Fokker D-7. The S.E. 5 in olive and all Squadron markings, etc. the D-7 in full camouflage pattern colors. This is simply full of color, very outstanding. LARGE size 17" x 14" with white border ..... $3.98 ☐



Painting No. 3—Shows **GERMAN FOKKER D-7** in a brilliant scarlet against a light blue and white sky. All markings, rigging, etc. as it shown flying, looking for prey. One of the most famous of WW 1 Aircraft and was featured in old photoplay "Hells Angels" LARGE size 17" x 14" with white border ..... $3.98 ☐

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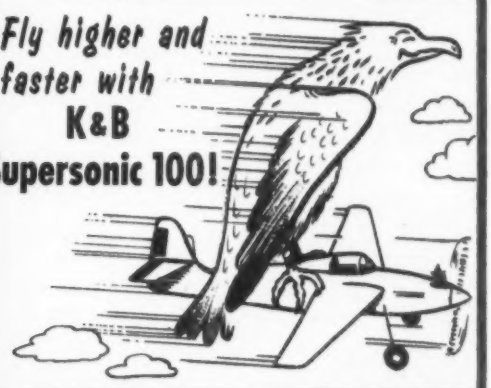

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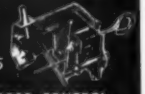

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8 x 6	12,050

How Much Faster?

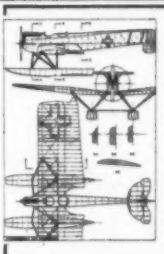
(*Continued from page 12*)

new Torp .29 ship and kept the record in the good old U.S.A.

All of the winning open speeds at the Nats were better than the winning speeds of the previous year. The winning speed in Half-A was almost 20 mph faster; Class A, 11 mph faster; Class B, 7 mph faster; Class C, 9 mph faster; Jet, 11 mph faster. The most wonderful thing of all was that these speeds and records were attained at the Nats, not at some local meet where everyone would feel there might be some reasonable doubt regarding the actual speeds. The speed goals that were once just a pleasant dream are now a reality.

The big question in most people's mind is why speeds should increase, in general, with the same type of engines used in each class for years. The answer seems to be twofold.

The most outstanding change that has taken place the past year is the almost complete transition to Mono-Line. This control that had been pioneered by a handful of modelers finally hit its stride in the speed circles and was engraved permanently in the minds of the "nitro burners" at the Nationals. Every open speed event at the Nationals was won by a ship of Mono-Line control. Records were set in Class Half-A, Class A, Class C, and Proto Speed. The jet record was bettered by a Mono-Line ship only two months earlier. What could be more convincing?



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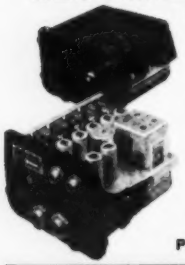

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Theories seem to vary as to just how the Mono-Line Unit should come out of the wing. The original trend was leading forward about ¼ in. Most of the records are held by ships with the lead-forward idea. Clem-Beasley-Kirn Team's rapid Half-A, which did 100 mph at the Nats, leads forward; Bill Wisniewski's very torrid 141-plus mph ship has a completely enclosed Mono-Line Unit that comes straight out of the CG—and so it goes.

Many of the early concepts about Mono-Line have now been disproved, such as not being able to fly in a pylon while using both hands to control the model and the avoidance of "whipping." Unbelievers should practice with the fishing pole if they want to be in the running.

The second part of the reason why the speeds went faster in '55 was that the fellows were simply getting more speed out of the same old engines. The only major production change in any engine seems to be in Cox's Half-A. The head was redesigned and the porting lowered. What a difference it made! Previously, only few of the little Gnats were breaking 75 mph. Now, the average speed is between 85 and 90 mph. The fuel still seems to be Thermal Hopper Racing Fuel and the best speeds were turned with reworked props of 7° and 8° pitch.

Class A was the same story with the Torp .19 carrying the ball again and at even greater speeds. There seems to be no end to the speeds that may be obtained with this speed-converted utility engine. At the Nationals, the first five places were faster than the winning speeds last year and all of these ships were Mono-Line. Probably one of the most clever sidelights at the Nats came when Jim Nightengale came out with his .60 job. He was flying a two-line ship and in disgust he had written "Bi-Line."

Class B was completely dominated by the almost extinct Dooling .29. There has been no real production of this engine in years, but old engines are rejuvenated by sprinkling replacement parts in them and their speeds seem to improve with age. A good example of how the old Dooling never tires was shown by Boyd Shelton, a Louisianan from Baton Rouge. Shelton had a stock Dooling that turned 138.5 mph every time he hit the air and caused the "hop-up" boys much alarm as he racked up several first places in this Class. The "hop-up" procedures that seemed to do the most good this year involved chroming and porting the sleeve and the use of high grade aircraft bearings in the front plates. The port jobs were, as termed by the die-hard speed modeler, rather mild, for they consisted only of beveling the intake and exhaust ports without actually changing the port timing in any way. The chrome jobs were in two separate classes: those produced commercially by Franny Wolf of Reading, Pa., and those that were attempted by individual speed modelers. Sam Beasley, of the Clem-Beasley-Kirn aggregation, had the most successful sleeve set-up that appeared this year. His procedure for chroming was as follows: lap a new Dooling sleeve to .001 total oversize on the diameter, which amounted to .0005 on either side; then have .00075 chrome plated on either side. Then once again lap the chrome. This proved to be fairly successful; however, it is not advised that any young "hop-up" artist take his cherished Dooling and attempt this chrome job, as Sam, with all his ability, was not able to get a good sleeve every time. The aircraft bearings are quite an expensive item as they cost about $5 each, retail. The bearings normally supplied in a model airplane engine are recommended for about 10,000 rpm's.

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Proto-Speed didn't produce any trends. However, it did prove to be a popular event. A few very good speed boys pitched in and built all-out Proto jobs, but the great majority of the ships were Team Racers. The event served to get new faces in the speed circles and occasionally new faces in the winners' circles, too.

The McCoy .60 just rolls along, picking up speed every year. The average speeds in Class C are now above that one-time coveted 150 mph mark and even a 160 mph flight did not guarantee a first place in

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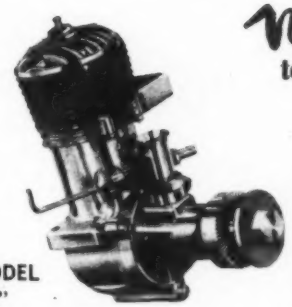

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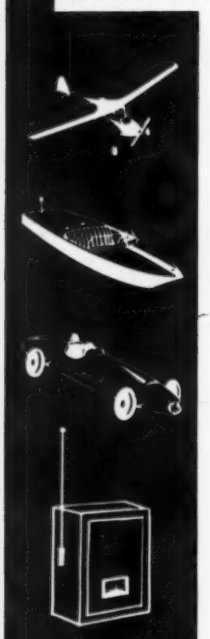

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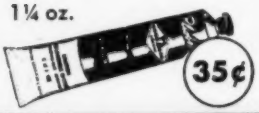

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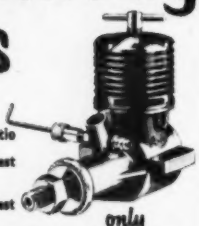

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1955. The best speeds were accomplished with rather stock McCoy .60's. Only individual freeing and hopping up procedures seemed to be prevalent, which consisted of cleaning the engine very thoroughly and cleaning up the ports by rounding or beveling the intake and exhaust ports. Once again, port timing changes seemed to hurt rather than help the performance of the McCoy .60; however, an old pro, though young in years, Eugene Stiles, built a real mill with a chromed McCoy .65, using an old Hornet .65 piston and rings. The engine struck fear into the hearts of his Texan friends, as Eugene did not convert to Mono-Line and still turned in flights of 160 mph or better. His top speed was 162.5 mph.

Much can be said about the off-breed pulsating class called Jet Speed. The speeds climbed in this event, too, and again few reasons can be given, other than use of Mono-Line and that the fellows know a little more about the flying blowtorches each year. The most effective procedure for getting a jet to better 150 mph seems to involve: 1. Facing off the flipper valve head. This is done by taking a large sheet of 400 sandpaper and placing it on the flattest surface available, preferably a mirror backing, being very careful not to round the edges of the surface. This can be accomplished by very smooth figure eight motions, common to such lapping jobs. This will remove all of the machine grooves on the back of the jet. The flipper retainer should also be cleaned of any carbon in order that the flippers may all be allowed to fluctuate at their fullest arc.

2. Another so-called "hop-up" procedure that helps a jet quite a bit is the insurance that the jet is sealing off around the fitting where the head is screwed into the tube. No really good method has been found to accomplish this. Most of the time, the surface on the tube is not square or flat and a leak results. One fellow used sodium silicate or water glass as a sealer. This worked very well as it was fire resistant, but it proved to be exceptionally hard to remove the jet head after the water glass had gotten into the threads. The biggest disadvantage was that on the field, when a flipper valve would blow out or break, it took considerable time to make the change. Dale Kirn drills eight holes around the bell in his tail pipe as a way of releasing pressure. Who knows, maybe it works. The first four places at the Nats were all a great deal faster than the winning speed of last year.

When Dale Kirn, flying the Clem-Beasley-Kirn airplanes, swept every place event at the Second King Orange Internationals in Miami, he set a new record in Jet at 166.6 mph and also bettered their existing Proto record by a couple of miles per hour. I understand that only a timer's error kept Dale from also bettering the Class B record. This gives this great speed team three of the six existing open speed records: Half-A, Proto and Jet.

In a passage such as this, personalities must be mentioned and their relationship to this type of competition. Some of the names such as Tommy Baker, Herbert L. Davis, Jerry Stebbins, Bob Elliot and Herb Shiman are conspicuous by their absence. Many of the old names in speed have retired from this type of competition; others were not able to make some of the big meets for various reasons. But whatever the reason for their absence, it was unfortunate, as they are a great credit to the sport and were sorely missed.

Other fellows seem never to lose their touch and some of their exploits are reviewed here: for instance, fellows like Bill Wisniewski, who can make the Torps do

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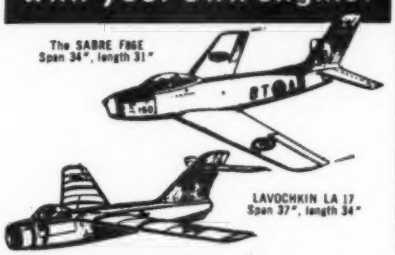

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things that others only dream about and I wish I could report to you what he does, but unfortunately I never had the nerve to ask the direct question of Bill, so I never got the desired information. His showing at the Nats with a "record-busting" performance in Class A re-established him as one of the all-time greats in this pylon parade.

Another fellow who made a great comeback this year was Bob Lauderdale. He did well in all classes; however, his actions in beating Clem and Beasley at both the Nats and the Southwestern and breaking their record in doing so most assuredly classify him as outstanding. He does a great deal with his engines in stock form. That is to say that his McCoy .60, for instance, had no major modifications. He exerts loving care on his engines and uses the file very sparingly and only does such things as take the squareness off the corners of ports and moving parts inside of the engine. His airplanes were the cleanest that have appeared in many years. When you are dreaming up your new "buzz bomb" for next year, a great deal of consideration should be given to this elliptical surface, butterfly tail, design. (*Plans for this model, Dizzy Boy, were published in the May, 1956 MAN—Editor.*)

Several fellows established themselves as comers in the speed field. Boyd Shelton will cause many graying hairs during the coming contest seasons. The most improved speed merchant of them all, though, is one Jimmy Summerset. He made an outstanding performance in Jet Speed down in Corpus Christi, Tex., early in the spring when he set a new standard of 163.5 mph on the heels of his win in the Phoenix Open earlier when he outran everyone in a Class C-Jet combined event. A faulty timing at the Nats knocked him out of an even better flight and held him to second place in this event. Jimmy was a real competitor in other events, too.

A great deal of praise should be given to Jim Clem, Sam Beasley and Dale Kirn when they proved that three heads are better than one and made a tremendous sweep at the Nats, taking firsts in Half-A, B, Proto, Jet, second in C and fourth in A. They set records in Half-A, and Proto and shook present record holders in other classes everytime they put another ship into the air.

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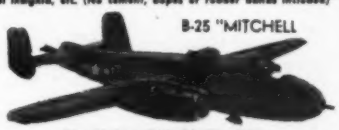

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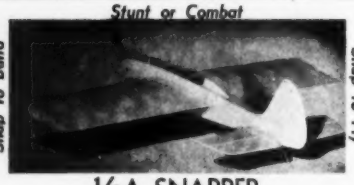
Stunt or Combat



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CRAFT, MODEL & HOBBY INDUSTRY

30 E. 29th St. New York 16

The most courageous performance of all and the one that made this old tired warrior's heart feel that this hobby is worth loving was turned in by our Lester Grogan. He got a third in B at the Nats, but later he trimmed the great Clem-Beasley-Kirn Team in Classes A and B only two weeks after the Nats in San Antonio, Tex., with speeds of 136 mph in Class A and 143.5 mph in Class B. He took their measure in Class B at the Greater Southwestern Championship with a duplicate speed of 143.5 mph. These performances, themselves, were something to be proud of, but it is an even greater accomplishment when you realize that Lester is confined to a wheelchair with crippling muscular distrophy. His friends made his flights for him, of course, but this took nothing away from his personal accomplishments.

To sum up the '55 Nats and the season would be to say that Mono-Line is as standard now as the pen bladder tank, preceded by the metal pans and glow plugs. The pen bladder tank, as we all know, consists of a piece of brass tubing about 1 in. long slipped into the end of a pices of black neoprene tubing (do not use clear tubing as it has a tendency to leak when it hardens). Then, slipping an ink sac or pen bladder over the neoprene tubing end that contains the brass insert, wrap the ink sac with heavy nylon thread and tie securely and insert into a penny balloon from six to eight drops of castor oil. Slip the balloon over the ink sac and once again secure with nylon thread.

Just a note about metal pans. Remember, these wonderful speed items can be as detrimental as they can be advantageous. Should you not get your engine mounted perfectly flat in the pan, you stand a very good chance of losing more rpm's than you gain by using the metal pans, because only the slightest amount of distortion in the motor mounts can cause a binding effect in either your sleeve or your front plate. The best way to mount an engine in a pan is first to face off the pan in a manner that you are sure will give you a flat engine mounting section. A good way to do this is by placing sandpaper of varying grades on a very flat surface and slowly grind away until you can take a straight edge and lay it across the side of the pan where the engine will mount and not be able to see light under any portion of the engine mount on either side, then use some sort of coloring material, such as oil paint, that can be purchased in any hobby shop. Place a thin film of the oil paint on the underside of your engine mounts and then place the engine in the pan and turn the engine from side to side slightly. This will transfer the paint from the engine mounts to the pan mounting surface. When all of the mounting surface indicates that paint is transferring, you have a good flat surface on which to mount your pan.

In selecting your pan, it is very wise to choose one that already has the wing tie-down bosses cast into the pan. Should this type of pan not be available, great care should be taken in bolting aluminum blocks on each side of the pan so that the airplane may be tied down through the wing. The airplanes that tie down using a bicycle spoke arrangement through the cowl just are not safe. Speeds give every indication that they will get faster each year. New safety precautions must necessarily be introduced for the coming seasons. Familiar faces still dot the winners' platform, but the challengers are moving up and the old pros' lofty perch is constantly under attack.

The '56 Nationals will be in Dallas,

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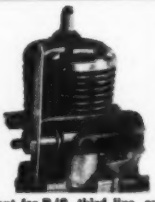

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Tex., the "hot bed" of speed flying in recent years. No doubt, there will be a mass migration about the middle of July to the Lone Star State by hopeful speed merchants from all over the U.S.A. to challenge the Southwest's crowd of uncrowned kings of speed. Take stock of this past year's experience and see if you, too, can make indelible your name in the speed annals of fame in 1956.

MAN at Work

(*Continued from page* 45)

motion pictures to show. AMA has the dope on this, fellows. Club numbers 20 members, although started only last February. From AMA in Washington, a surprise note that the General Assembly of the FAI, in Vienna, made Frank Zaic one of five American recipients of the Paul Tissandier Diploma. Frank, long time designer of Wakefield and towliners, and publisher of the Model Aircraft Yearbook, is the first modeler in America to be thus honored. Co-winners include William Piper, Sr., Colonel Roscoe Turner, and Colonel Horace Haynes, who set the world speed record of 822.266 mph last August. Frank is in fast company. . . . Capitol City Comets (Robert Curtis, 428 21st Street, Charlestown, West Virginia) meets twice monthly in the North Charlestown Recreation Center. Thirty-four members already, of which 60% are under 16 years of age. Wants names of nearby clubs, dope on carrier event. For the first time in umpty-ump years MAN at Work can't keep up with the mail, so all club secretaries, please ask AMA for all such dope. They have booklets on forming clubs, running contests. Anyone can buy a rules book for a dime. It answers all kinds of questions. That's the Academy of Model Aeronautics, 1025 Connecticut Avenue, Washington, D.C. . . . asks 12-year-old Loren Lee Little, "Can you tell me where you get plans for models you carve out? A man told me he had made some about 20 years ago. I hope you know what I am talking about." Sure do, Loren, but the people who sell and distribute model airplane material aren't interested in anything so hard to do, for them that is. You can find a plan for an occasional solid in MAN pages. . . .

* * *

If you live in the east and would like to see an indoor contest, do try to take in the Indoor Record Trails, at Lakehurst, N.J., June 3, August 5, September 9, and 23. The Navy provides the airship dock in which the magic half-hour flights have been made. If you never saw an indoor model you owe it to yourself to get hep. Emanuel Radoff reminds us that Tony Becker, 2212 Griffith St., Philadelphia 15, Pa., can tell you about it. . . . "The parrot is the bird that does the most talking and the least flying," said Orville Wright in 1910. For their club emblem the newly formed Topeka (Kansas) Parrots, have a begoggled parrot, and the famous quotation as a motto. Modelers' humor! The Topeka Parrots is a dynamic club, says the corresponding Parrot, eh, secretary, Murray Hamilton. Topeka had clubs in past but, built around a specialty, they all hit disastrous downdrafts. Doc Weber, UC, RC, FF (and those are not degrees, buster) finally brought off a promising organization. One member even builds boats and no one talks him out of it. There's an executive council with representatives for free flight, controlline, etc. When you get out as far as Topeka you are in C.O. Wright territory. C.O. has been hitting the contest trail for nigh on 40 years, all the while boosting modeling. Thanks to the old boy regular meetings are held in the wonderful new Kansas State Teachers Association Headquarters Building. 'Tis rumored that the parrots are eyeing that auditorium. Indoors, anyone? The talkative Parrots also read. Every member reads MAN. Smart boids, them Parrots.

Contest Calendar

(*Continued from page* 44)

derby. George Moir, C.D., Main St., Mantua, N.J.

15-20 *Houston, Tex.:* Air Force World Wide Model Airplane Championships. Entry restricted to qualified Air Force personnel.

22 *Perth Amboy, N.J.:* Class AA Combat Olympics for CLC. Adam Ginda, Jr., C.D., 21 Omaha, Dr., Cranford, N.J.

22 & 29 *Ann Arbor, Mich.:* Class AA Ann Arbor Airfoilers and Exchange Club Contest for OHLG, FFG, OR, RC, CL, CLS, CLC, CLFS. Albert L. Temple, C.D., 9971 Doris, Livonia, Mich. Pending.

22 *Kohler, Wis.:* Class AA 5th Annual Free Flight Meet for OR, OHLG, TLG, RC, FFG. Wilbur A. Lea, C.D., 1030 No. 14th St. Sheboygan, Wis. Pending

23-29 *Dallas, Tex.:* Class AAAA National Championship Model Airplane Contest.

29 *Fresno, Calif.: Fresno Gas Model* Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

29 *Largo, Fla.:* Class AA 1st Largo Prop Twisters' Model Contest for CLC, CLS, CL. Claude J. Rinehart, C.D., 711 2nd St., S.W., Largo, Fla.

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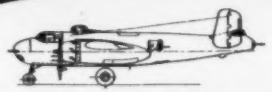

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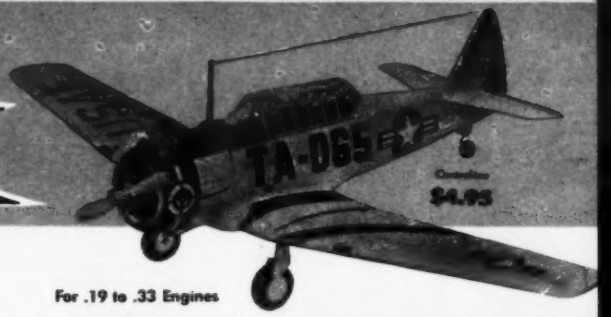

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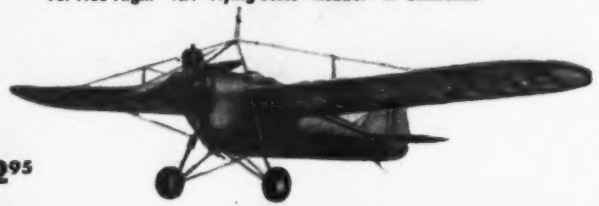

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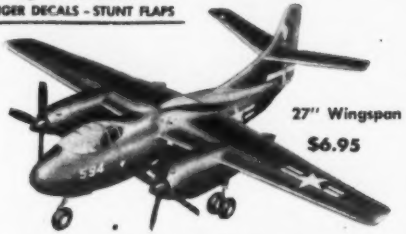

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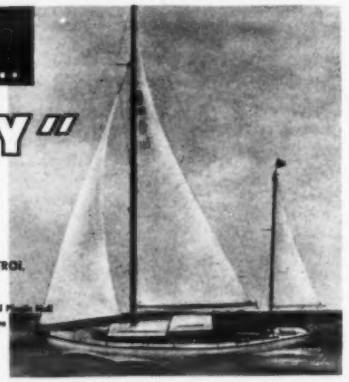

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KIT FEATURES: All the wood parts completely prefabricated, hardware and landing gear, plus new "JIG-PLAN" for accurate, speedy wing assembly and complete step-by-step photo assembly instructions.

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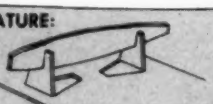

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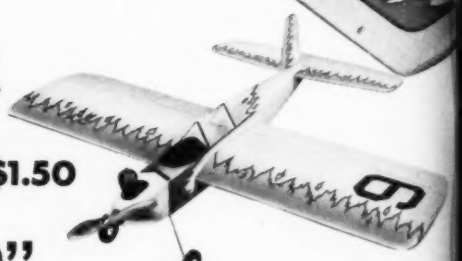

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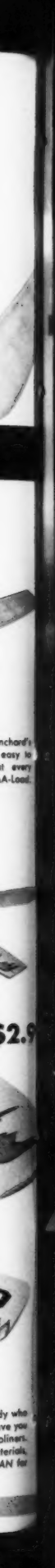
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